Are IS and your business in sync? Learn how to "Align in the Sand." Leadership Series follows page 32.

RAID storage: Prices are falling, but not fast enough for users. Buyer's Guide, page 73

COMPUTERWORLD

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NETWORK COMPUTERS

PCs morphing into NCs

▸ *Java on DOS could turn old PCs into NCs*

By Sharon Gaudin and April Jacobs

SUN MICROSYSTEMS, INC. is trying to lure more companies into the network computer pool by offering them a way to recycle their aging PCs.

Sun last week said it is developing Java for the character-based DOS operating system, which runs with versions of Windows 3.x. Enabling Java programs to run on DOS would let companies convert their depreciated 486-based PCs to network computers, which would help users save money on hardware upgrades.

Sun will outline Project Rescue at the JavaOne conference in early April and should have a final product sometime this year, company officials said.

"It looks like an interesting way to revitalize some of these old 486s that are just sitting on the floor," said Larry Hagerty, a

Sun, page 99

▸ *Net computers end-run PC migration costs*

By April Jacobs

Burlington Coat's Mike Prince says initial NC install is just "tip of the iceberg"

JUST SAY NC.

That's what Burlington Coat Factory's Mike Prince decided last year when the company wanted to move more than 1,500 users who now use a mix of PCs and dumb terminals to systems that would meet lean cost guidelines. But he also wanted to provide graphical user interface-enabled, user-

Network computers, page 99

'Push' software has yet to come to shove

▸ *Immature tools, expense slow down the arrival of World Wide Web delivery technology*

By Robert L. Scheier

A NEW GENERATION of "push" software could help sales representatives find new prospects, alert field offices to sudden price changes and even make it easier for information systems managers to distribute software.

But don't expect to see many push applications rolling into production soon. (For an early example, see story at lower left.)

The technology is immature, the automated tools to manage it have yet to be developed, and nobody knows how well it will scale to handle large numbers of users and amounts of data.

"The easy plug-and-play tools aren't there yet," says Matthew Soltis, a systems analyst at NetworkMCI in Washington. "The network [bandwidth] isn't there yet. The solutions to do this [are] very costly."

But Soltis says he is confident that the potential benefits of push eventually will outweigh such problems.

For businesses, those benefits

Managing, page 66

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Lek Technologies uses desktop chip. Page 4

Wal-Mart whopper
RETAILER BUILDS 24T-BYTE DATA WAREHOUSE. PAGE 8

• Network speeds data to dealers

Ford extranet to spark loyalty

By Mitch Wagner

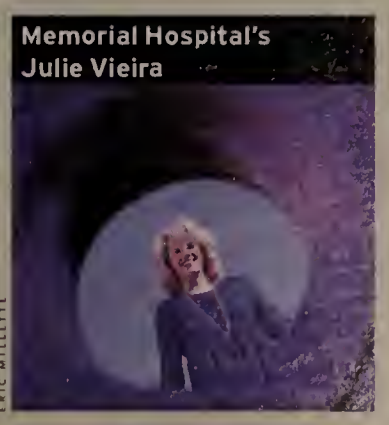
FORD MOTOR CO. plans by June to start rolling out a network designed to help more than 15,000 Ford dealers worldwide provide better service — so when a customer drives a new Ford off the lot, it won't be a one-way trip.

The FocalPt extranet network is a unified system that supports the sales and servicing of automobiles. Its goal is to provide showroom-to-junkyard support to Ford customers.

The system will offer promotional, inventory and financial information designed to help close a deal. FocalPt also will automate dealer service centers so when a car needs to be fixed, distributors can find repair information specific to that make and model, as well as that car's repair history.

"We really want to make a substantial change in customer satisfaction and owner loyalty by making people's experience with Ford dealers more pleas-

Ford's extranet, page 16



By Kim S. Nash

Swapping pen and ink for computerized renditions of **signatures** on invoices and other business forms may seem like a nifty way to save paper, time and money. But **technical and cultural land mines** await.

Signatures, page 26

NEWSPAPER

UP FRONT

Sell, sell, sell!

Note to the lawyers: The following is a joke.

NEW YORK — High-tech stocks rode a roller coaster last week as investor skittishness about computer industry growth prospects continued.

IBM shares dropped $6 at the opening bell on speculation that Chairman Louis V. Gerstner was stuck in traffic and would be late for work. But IBM stock recovered half its earlier loss when Gerstner arrived only 20 minutes late and canceled a morning meeting.

3Com was battered by an executive's comment that Singapore was "a nice place to visit" but that he "wouldn't want to live there." It was taken as a warning of slower growth in Southeast Asia and sent networking stocks into a nosedive.

Apple was knocked back 1½ points when it failed to announce anything at all, deepening investor nervousness that the vendor is aimless and adrift. Shiva canceled an analysts' conference call because of a local snowstorm. Its shares tumbled 23%.

The news wasn't all bad

The news wasn't all bad, though. Digital shares gained after the company estimated that earnings would be disappointing. Analysts had been expecting Digital to report a much bigger earnings disappointment than the one it expects to report, meaning they weren't as disappointed as they thought they would be.

Compaq fell because it just seemed like it was time for it to fall. Gateway gained on reports that Chairman Ted Waite had a good visit to the dentist. No cavities, even. Dell surged 15% after Dewey, Cheatham and Howe analyst Tim Bottomfisher upgraded it from "underwhelm" to "outdistance."

Microsoft dragged down the Nasdaq index by dropping 11 points. Company officials said Microsoft has a 90% market share in office suites, but analysts worried that it is running out of places to grow.

Nevertheless, "the overall trend is gratifying," said Samson, Delilah analyst Mark Shortsell. "Wall Street is finally learning how to understand high tech."

Paul Gillin, *Editor*
Internet: *paul_gillin@cw.com*

THE FIFTH WAVE

BY RICH TENNANT

E-mail Rich Tennant at thewave@tiac.net

Texas investigating Microsoft tactics

▸ *Attorney general looks at competitive practices for antitrust violations*

By Justin Hibbard

TEXAS WANTS to make sure its businesses have a fair chance to compete with Microsoft Corp., but the state isn't waiting for the federal government to come to the rescue.

The Texas attorney general's office last week sent Microsoft a civil investigative demand (CID) — Texas' version of a subpoena — that requests information about Microsoft's competitive practices in the Internet software market. Microsoft officials confirmed the company had received the subpoena but wouldn't comment further.

Officials at the Texas attorney general's office refused to comment, but sources familiar with the investigation said the state is examining the impact of Microsoft's business practices not only on software companies but also on any company that offers services on the Internet.

Gary Reback, an attorney for Netscape Communications Corp. in Mountain View, Calif., and a prominent figure in efforts to charge Redmond, Wash.-based Microsoft with antitrust violations, said Texas contacted Netscape in December with a similar CID. Netscape complied with the request, Reback said.

BIG IMPACT FEARED

"Their concern was that one company shouldn't be able to choke off all of Internet commerce," he said. "There were rafts of companies that could be impacted in the state."

One such company, The Sabre Group in Fort Worth, Texas, offers a travel reservations service called Travelocity on the World Wide Web. The service competes with Microsoft's Web-based travel service, Expedia, which is easily accessible through default links built in to Microsoft's Internet Explorer browser.

Possibly feeding concerns is the fact that Microsoft offers its Internet Explorer browser for free. The product last quarter gained 20 points of share in the corporate market while Netscape's $49 Navigator browser lost 13 points, according to Zona Research, Inc. in Redwood City, Calif. Also, Microsoft plans to offer Internet Explorer 4.0 as the interface for its Windows 95 operating system, which will come installed on 76% of all PCs shipped this year, according to Dataquest in San Jose, Calif.

A spokeswoman for Sabre wouldn't say whether officials at her company believe Expedia has an unfair advantage because of its accessibility through Internet Explorer. But Scott Smith, director of the digital commerce group at Jupiter Communications, Inc. in New York, said businesses such as Sabre have reasons to be concerned.

"[Microsoft] certainly raises the hurdle higher than it might otherwise be for people to get to other services on the Web," Smith said. When users start Internet Explorer, "they are three steps away from [Microsoft's] retail services, so I can see where there's a concern," he added.

But whether that advantage is grounds for an antitrust case is uncertain, according to Steve Newborn, an attorney who specializes in antitrust issues at Rogers & Wells in Washington.

"At the end of the day, how is the consumer going to be hurt here?" Newborn asked.

SUCCESS IS RARE

To win a case, the Texas attorney general's office would have to prove that Microsoft is shutting out all of its competitors in order to raise prices on its products and services, a practice called predatory pricing, Newborn said.

"Successful predatory pricing cases are very rare," he said.

Past attempts to bring antitrust charges against Microsoft have met with little success. The U.S. Department of Justice in 1994 settled a four-year investigation into Microsoft's business practices (see chart).

1994 MICROSOFT ANTITRUST RULING

Key points of the July 1994 agreement between Microsoft and the Justice Department:

- Microsoft is prohibited from using per-processor licenses and minimum purchase terms. Licenses are limited to one or two years.
- Nondisclosure agreements are limited to one year. The agreements must not prevent programmers from working on rival operating systems as long as Microsoft's proprietary information isn't disclosed.
- Microsoft can't require PC makers to purchase another of its products as a condition for licensing a Microsoft operating system.
- The settlement is binding for six and a half years; it doesn't apply to Windows NT Workstation or Windows NT Advanced Server.

In August 1995, the Department of Justice declined to take antitrust action against Microsoft over bundling The Microsoft Network with Windows 95.

"[The state's] concern was that one company shouldn't be able to choke off all Internet commerce."
– Gary Reback, attorney for Netscape

@Computerworld wins prestigious award

At the Interactive Newspapers Conference last Friday in Houston, *Computerworld*'s online service, www.computerworld.com, took home one of three awards for "best editorial content for an online newspaper." @Computerworld won in the weekly newspaper category.

A total of 30 awards were given by *Editor & Publisher* magazine. More details are available at www.mediainfo.com.

"I am thrilled for our site," said Online Editor Johanna Ambrosio, speaking for her staff of 12. "It signifies how seriously we take online publishing at *Computerworld*."

Microsoft ships kit for Active Directory

By Laura DiDio

MICROSOFT THIS WEEK takes a step toward turning Windows NT's major weakness into an asset with the release of a software developer's kit for its upcoming Active Directory.

The Active Directory Services Interface (ADSI) kit will let software developers build cross-platform applications using tools such as the Visual Basic, Java or C/C++ programming languages, according to Microsoft Corp.

Ultimately, end users will be able to buy a wide variety of

applications that run on multiple directories, including Windows NT, Novell, Inc.'s Novell Directory Services and any Lightweight Directory Access Protocol directory.

"It's tough keeping track of 80,000 users at 100 locations. ADSI promises to provide us with a way to very quickly locate and identify all the users."
– Paul Hoedeman, CIO, AlliedSignal

The Windows NT 5.0 Active Directory is being alpha-tested by a limited number of users. Widespread beta testing is slated to begin during the first half of the year.

"They're essentially turning their traditional weakness — the directory — into a strength by giving users directory independence. The same application will run on a variety of different directories, thereby reducing development time and network support costs," said Neil MacDonald, an analyst at Gartner Group, Inc. in Stamford, Conn.

"We have 45,000 Microsoft Mail clients, and it's tough to keep track of them and manage the accounts" with Microsoft's current directory, said Paul Hoedeman, chief information officer at AlliedSignal Aerospace in Torrance, Calif.

Hoedeman said one of the biggest challenges confronting his network administrator is identifying and locating resources, such as users, groups, documents and devices.

"It's tough keeping track of 80,000 users at 100 locations. ADSI promises to provide us with a way to very quickly locate and identify all the users that are available on our network," he said.

Many Microsoft rivals, including Banyan Systems, Inc., Novell, Hewlett-Packard Co. and Compaq Computer Corp., have said they will support ADSI in their products.

ADSI is being sent to about 200 developers and customers this week and also will be available as a free download on Microsoft's World Wide Web page at www.microsoft.com.

Friends of the family

Family matters command top attention at Sears, Roebuck and Co. Sears uses family-friendly benefits to recruit and retain top IS professionals. Mary Beth Swibes (right), a systems consultant at Sears and a telecommuter, understands the need.

Careers, page 83

ANDY GOODWIN

Visual C++ 5.0 said to be easier, faster

▸ *Powerful development tool moves toward integrated environment*

By Sharon Gaudin

MICROSOFT CORP. has made the latest version of Visual C++ faster and easier to use while it prepares to meld the powerful development tool into an integrated environment.

Announced last week, Visual C++ Version 5 will be released March 19 at the company's annual Developers Day seminar.

Enhancements include easier construction of ActiveX components, additional class libraries, timesaving application development wizards and native support for Microsoft's Component Object Model.

Visual C++ is already considered one of the more high-octane development tools. Competitors in the market include Borland International, Inc. in Scotts Valley, Calif., and Symantec Corp. in Cupertino, Calif.

C++ may soon meld into Visual Studio '97

Redmond, Wash.-based Microsoft hopes to leapfrog ahead by preparing its Visual C++ for integration with a forthcoming development suite called Visual Studio '97.

"Microsoft is bringing all of its tools closer together with each version release," said Jim Ross, an assistant vice president at NationsBank Corp. in Charlotte, N.C.

"It's been a long, rocky beta because they're trying to add in all the common characteristics. It's getting hard to separate Visual C++ from Visual Studio," Ross said.

Visual J++, Microsoft's Java tool, and Visual InterDev, its Internet development environment, were built with the Visual C++ environment. The class libraries in all the tools are becoming increasingly similar, and the component-creation capabilities in Visual C++ and Visual Basic are now much more similar.

Mike Massa, president of Massa Computer, a New York-based application development company that specializes in Visual C++ and Visual Basic, said the enhancements to Version 5 of Visual C++ will make it easier and faster for him to build applications.

"I've been working with Visual C++ since Version 1, and this is the biggest leap," Massa said. "The new wizards ask you basic questions, and then it will do the [object and coding] work for you. That saves me time and money."

Visual C++ Version 5 has an Application Wizard, which speeds the component-building process with dynamic responses to preset questions.

Massa said it is also easier to build small, fast-running ActiveX components with this latest version.

Evan Quinn, an analyst at International Data Corp. in Framingham, Mass., said the ActiveX development feature is especially important.

"Visual C++ is the primary tool used today for building components," Quinn said. "They've made it far easier to do that."

Visual Basic gains power but loses some ease-of-use traits. Page 43

Chevron's IT arm to slash 600 positions

By Thomas Hoffman

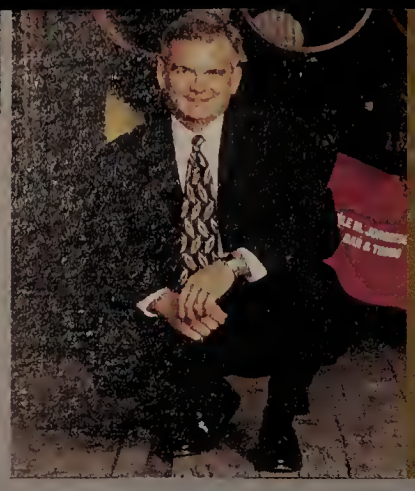
CHEVRON INFORMATION Technology Co. (CITC), the San Ramon, Calif., IT arm of San Francisco-based Chevron Corp., has announced a restructuring aimed at creating a common global network computing environment for the oil and gas refiner.

The move is expected to result in the elimination of 100 information technology positions by April 1 and another 500 positions by the end of next year.

CITC, which has 1,660 employees, expects to end up with about 1,200 employees after the restructuring is completed. As part of the reorganization, the unit is adding 200 information systems employees from other Chevron companies.

The reorganization is expected to deliver $50 million in annual cost savings by the time it is completed late next year. Most of the savings are expected to be achieved through Chevron's shift to a common global network. A spokeswoman for the company said she wasn't sure when the network architecture will be selected.

As part of the reorganization, CITC also plans to outsource its mainframe and telecommunications operations by next year. A source at CITC said the firm is in the early stages of exploring those opportunities.



TRY AGAIN: One upgrade wasn't enough for Mark McWhirter's firm. Corporate Strategies, page 63

LESS IS MORE: Unobtrusiveness is the next design challenge, Mark Weiser and John Seely Brown say. In Depth, page 81

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Align in the sand
Jerry Luftman provides an action plan to align IS and your business. **Follows page 32.**

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Upstart ships first 200-MHz laptop

By Mindy Blodgett

WHILE THE OTHER laptop vendors wait for Intel Corp. to ship its 200-MHz Pentium MMX notebook chip, a tiny Texas-based company has beaten the big guys to the punch.

LEK Technologies, Inc. in Amarillo, Texas, last week started shipping FutureNote MX 200s, a laptop that uses Intel's 200-MHz desktop chip. It costs $3,550 to $3,950.

It is unlikely that the more-established laptop vendors will follow LEK's lead because they don't want to anger Intel by not waiting for the laptop processor to ship later this year, according to observers. The fastest notebook chip currently available from Intel is the 166-MHz MMX chip.

But LEK wasn't willing to wait. "Intel has been dragging its feet on the notebook side with the 200 chip, so we just went ahead and designed a laptop using the desktop chip," said LEK President Lloyd Kruckeberg.

Intel's laptop processor is being designed with lower voltage, which will address the two key design problems associated with notebooks: heat and power drain.

But Kruckeberg said LEK has worked around the heat created by the desktop chip by adding a heat sink and cooling fan.

However, the 6.3-pound laptop only has about one hour of battery life because of the power drain of the chip and the fan, Kruckeberg said.

Chris Reed, director of sales and marketing at Great Western Distributors, Inc. in Amarillo, a beer distributor for Coors, Inc., has purchased a few FutureNotes.

"We really need the 200 speed because the field reps have to download a lot of graphical material while on the road," Reed said. "We were desperate for the power and didn't want to wait."

Apple seeks to reverse slide in notebook sales

By Lisa Picarille and Mindy Blodgett

APPLE COMPUTER, INC. Chairman and CEO Gilbert F. Amelio recently said when PowerBooks do well, Apple does well. So it isn't hard to surmise what has happened to struggling Apple's one-time leadership position in the laptop market.

While the laptop market exploded between 1995 and 1996, Apple sat on the sidelines (see chart).

MISSED THE BOAT

Observers said the company failed to execute a strategy to leverage the PowerBook — one of its most popular products ever — to boost sagging revenue.

Critics also charged that Apple's share of the laptop market waned because of the company's ineptitude.

Apple failed to get new PowerBooks on the market last year, didn't meet product demand and had to recall some faulty models in May when users became concerned about quality.

To curb that downward slide, Apple is expected later this week at Macworld Expo in Tokyo to take the wraps off its long-awaited PowerBook 3400, code-named Hooper.

Apple touts the multimedia line of laptops, which run on PowerPC 603E chips at speeds of 180, 200 and 240 MHz, as the fastest laptops on the planet.

The 3400s that run at 180 and 200 MHz are expected to be available immediately.

The 240-MHz version is due in April. The Hooper models are expected to cost between $4,500 and $6,500.

Intel Corp. isn't expected to announce a 200-MHz MMX Pentium processor for laptops until later this year.

APPLE FALLING

Apple's standing in the U.S. portable computer market

	Market share	Market rank
1995	9.2%	3
1996	2.3%	10

International Data Corp., Framingham, Mass.

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As Apple unveils new models, clone maker steals show with cuts

By Lisa Picarille

APPLE COMPUTER, INC. will release a slew of Power Macintosh models this week in hopes of sparking user interest. But a clone maker is about to steal Apple's thunder with dramatic price cuts.

Macintosh clone vendor Power Computing Corp. in Milpitas, Calif., will slash prices by 21% on most models, *Computerworld* has learned. The clones are comparable to Apple's new models and in some cases are faster.

Apple is expected to pump up the high end of its market with three Power Macintosh 9600 offerings. Those machines are aimed at professional publishers and video and graphics professionals.

All the 9600 models are based on the PowerPC 604E chip. A 233-MHz version of the 9600 isn't due until May, but the 200-MHz model and its multiprocessing version are slated for release next month. Prices for the 9600 family are expected to range from $3,700 to $4,800.

APPLE TO UNLEASH NEW POWER MACS IN MARCH

Model	Processor speed	Memory	Hard drive	Cache	Price range
9600	200 MHz 233 MHz* 200 MHz (MP)	32M bytes	4G bytes	512K bytes	$3,700 to $4,800
8600	200 MHz	32M bytes	2G bytes	256K bytes	$3,200 to $3,300
7300	200 MHz 180 MHz	32M bytes 16M bytes	2G bytes	256K bytes	$2,300 to $2,800
4400	200 MHz	16M bytes	2G bytes	256K bytes	$1,700 to $1,750

*Due in May

TIT FOR TAT

By contrast, prices for Power Computing's PowerTower Pro high-end machines, running at 225 MHz on a 604E PowerPC chip, will be reduced by $600, from $4,295 to $3,695.

Apple also will introduce the Power Macintosh 8600. The 200-MHz machine features near-broadcast-quality video I/O capabilities and graphics acceleration. The new model costs about $3,250.

Power Computing will reduce the price of its comparable PowerCenter series. A 180-MHz system will drop by $600, from $2,795 to $2,195. The PowerCenter 150 price will drop $400, from $2,095 to $1,695.

Apple's new Power Macintosh 7300 is a midrange line aimed at midsize businesses. The systems, which run on the 604E PowerPC processor, come in 180- and 200-MHz versions. Prices start at $2,300 and go up to $2,800, depending on the configuration.

At the lower end of the spectrum is Apple's new 4400/200. It costs $1,700 and is billed as an all-purpose business machine. The 4400 uses the PowerPC 603E chip and has 16M bytes of RAM and a 2G-byte hard drive.

Power Computing is also cutting prices on its entry-level systems, the PowerBase 240, 200 and 180. The price of the 240-MHz version will drop by $300, from $2,195 to $1,895. The cost of the 200-MHz version will be reduced by $300, from $1,995 to $1,695. The price of the 180-MHz model will drop by $200, from $1,495 to $1,295.

A STABLE RELATIONSHIP

One user said that, although Apple's new machines sound attractive, other factors must be considered before purchasing more Macintoshes — mainly the stability of Apple's new dual operating system strategy.

"Whizzy new machines are great, but we need a stable, reliable operating system. That is our main concern," said Bill McCauley, acting data processing manager at the Alaska Legislative Affairs Agency in Juneau, which has about 250 Macintoshes and 200 PCs.

One analyst said Apple's forthcoming machines are needed to keep up with the clone competition but wondered when Apple will leapfrog its competitors.

"You would think that, since some of the other clone makers have already shipped 240-MHz machines, Apple would be trying to match or surpass that to regain the clock-speed leadership position at least," said Ken Lim, editor and publisher of "CyberMedia 2001," an industry newsletter in Cupertino, Calif.

SHORTS

Microsoft wins new hearing

A federal appeals court last week agreed to reconsider an earlier ruling that granted pension benefits and stock-purchase options to hundreds of freelance workers employed by Microsoft Corp. in Redmond, Wash., between 1987 and 1990. In October, a three-judge panel of the 9th U.S. Circuit Court of Appeals in San Francisco ruled that the temporary workers performed the same work as regular employees and were entitled to benefits. The appeals court last Monday voted to refer the case to an 11-judge panel for a new hearing, scheduled for March 27.

Motorola sues U.S. Robotics

Motorola, Inc. in Schaumburg, Ill., last week filed a complaint in U.S. District Court in Boston against Skokie, Ill.-based U.S. Robotics Corp. claiming that U.S. Robotics had infringed upon several Motorola patents for high-speed modem technology. Motorola claimed that patents for its V.34 modem standard may also apply to the 56K bit/sec. modems U.S. Robotics has been touting. Motorola last week settled a similar suit with Rockwell Semiconductor Systems in Newport Beach, Calif., by agreeing to collaborate on establishing a 56K bit/sec. modem standard.

Bay Networks lays off 100

Bay Networks, Inc. officials last week said the company laid off more than 100 employees — about 1.5% of its workforce — to consolidate its multiple sales, service and marketing organizations. Officials at the Santa Clara, Calif., internetworking vendor said the layoffs were "a one-shot deal."

Eudora mail server to debut

San Diego-based Qualcomm, Inc., which makes the popular Eudora Internet mail client, this week will announce Eudora WorldMail Server, an Internet mail server. The Eudora WorldMail Server runs on Windows NT and will be available in April to run with or without the Eudora client.

The server costs $1,875 for 500 users or $21,100 for the client/server bundle. Eudora WorldMail Server supports Internet Mail Access Protocol 4 as well as Lightweight Directory Access Protocol for storing user names. "[WorldMail] would probably be adequate for about 80% of our users," said Rick Smith, systems manager at Northern Arizona University in Flagstaff.

U.S. Patent Office to modernize

The U.S. Patent and Trademark Office in Arlington, Va., has awarded contracts worth more than half a billion dollars to Lockheed Martin Corp. ($254 million) and Computer Sciences Corp. ($287 million) to help modernize the office's business systems.

RS/6000 memory prices cut

IBM has cut system memory prices up to 44% for RS/6000 workstations and servers. Coupled with price decreases for graphics accelerators on workstation models, the new price reductions mean some users could save as much as 34% on the total system price. The move is an effort to lure users from Unix rivals that already sell high-performance 64-bit systems and increase RS/6000 sales, which slumped last year.

HP 9000 preloads Netscape

Hewlett-Packard Co. officials last week said the Palo Alto, Calif., company will start preinstalling Netscape Communications Corp.'s FastTrack Server and Navigator Gold software on all its HP 9000 servers and workstations. Users with support contracts won't be charged for the new software, according to HP.

HP slashes prices on Vectra PCs

Hewlett-Packard late last week cut prices on its Vectra line of PCs by as much as 23%. For example, a Vectra VE PC equipped with a Pentium 120-MHz processor, a 1G-byte hard drive and 8M bytes of RAM is expected to retail for $931.

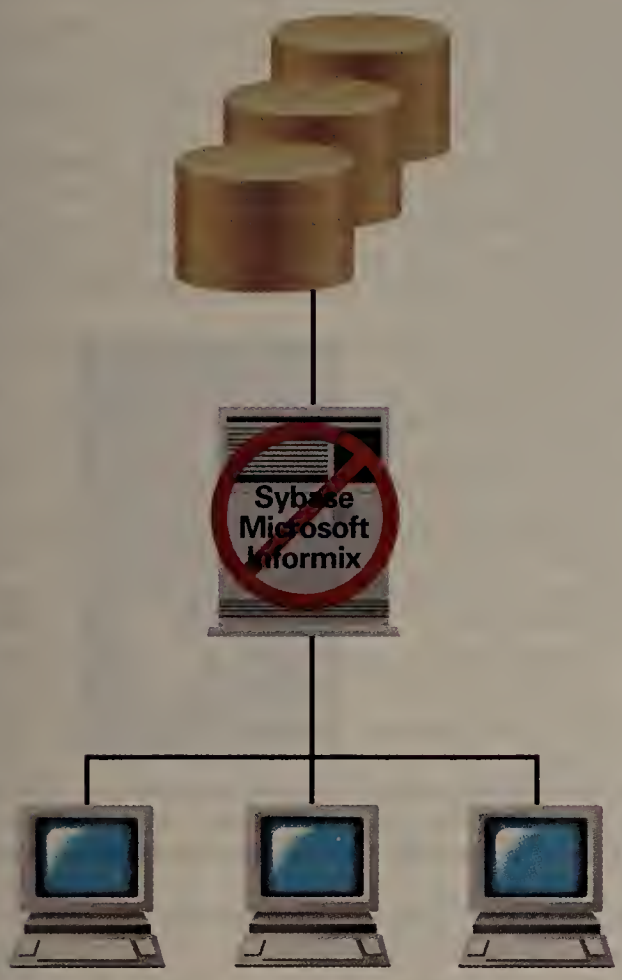
Tandem boosts data mining

Tandem Computers, Inc. officials last week said the company would add object-enabled data-mining capabilities to its ServerWare database. The technology will help users run complex queries against an entire set of warehoused data, not just samples, officials at Cupertino, Calif.-based Tandem said. Shipments of the Object Relational Data Mining technology with ServerWare are scheduled for the third quarter.

Oracle Parallel Server: Fault Tolerant

Oracle7 Parallel Server™ allows multiple servers to access a common pool of disks sharing the same database. With Oracle7, if one of these clustered servers should fail, the other servers carry on running the application. Neither Sybase, Microsoft, nor Informix provide this level of reliability, availability and security for your applications and data.

Sybase, Microsoft, Informix



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Kmart races to build E-commerce site

By Thomas Hoffman

ATTENTION KMART shoppers. The good news is you will soon be able to purchase up to 1,500 Kmart items over the Internet. The bad news is you will still be able to find a wider selection at Wal-Mart's Web site.

World Wide Web developers at Kmart Corp. are working around the clock to finish an electronic commerce site that sources said will be a trimmed-down version of Wal-Mart Stores, Inc.'s Internet shopping service.

Wal-Mart, which launched an Internet-based merchandise catalog last spring, offers more than 2,500 products on its site and plans to expand that to more than 80,000 items later this year.

Several sources close to Kmart, including the company's former webmaster and financial analysts, said the Troy, Mich.-based retailer plans to launch its online shopping network by April 1.

Sources say Kmart has spent $19,000 to develop its site, using Microsoft's Merchant electronic commerce tool kit

Kmart is using Microsoft Corp.'s Merchant electronic commerce tool kit to construct the site, said Rod Fournier, a former Kmart webmaster who now runs a Windows NT 4.0 training service called Networking America in Troy.

A Kmart spokesman confirmed that the company is working on electronic commerce but said a roll-out date for the service hasn't been set.

Neither Wal-Mart nor Kmart is expected to spend big bucks on developing Internet shopping networks.

Kmart's move is seen as mainly defensive. "If Wal-Mart does it, then Kmart has to," said Joel W. Wyman Jr., a managing partner at ISYS Consulting Group Ltd., a retail operations consultant in Huntington, N.Y.

Life insurers find their products a hard sell online. Page 59

Wal-Mart triples data warehouse

▸ *Retailer leads trend for deeper sales analysis*

By Craig Stedman

INCREASINGLY, THE price for staying competitive in the retail business is a mondo-size data warehouse.

For example, Wal-Mart Stores, Inc., the king of all retailers, last week said it will triple the size of its data warehouse to a whopping 24T bytes by mid-year. That will let business analysts at the Bentonville, Ark., behemoth look at sales down to the level of individual cash-register transactions.

Several other retailers said they are being pushed to expand their warehouses in similar, if more modest, ways. Such fine-grained analysis is expected to provide a clearer picture of customer buying habits, which could yield benefits ranging from better store layouts to more effective product-pairing promotions.

Wal-Mart's Randy Mott: Sales data needs to be analyzed "to a finer and finer level"

But those benefits won't come cheaply. The so-called "market basket" data derived from point-of-sale (POS) transactions gobbles up disk space, especially after it gets indexed and sliced and diced into multiple summary tables. Analysts said a terabyte's worth of disks can cost upward of $1 million, before even taking into account added processor, memory and software costs.

COSTLY ADDITION

Wal-Mart is expected to pay $40 million to $60 million to bulk up its NCR Corp.-supplied Teradata database and parallel processing hardware to make room for up to a year's worth of cash-register transactions. Both NCR and Randy Mott, senior vice president and chief information officer at Wal-Mart, declined to comment on the cost.

By analyzing individual transactions, Wal-Mart wants to "start answering a lot of the questions that you can't get to now" via the more categorized data in its warehouse, Mott said. For example, Wal-Mart analysts will be looking to find products that often sell together so the company can display them next to each other.

The end result should be higher sales, Mott said. Wal-Mart typically looks for returns on investments within two years, "and the potential is there with this," he added.

Until now, retail data warehouses were mostly aimed at controlling inventory costs. But stiff competition is pushing chains to get a better handle on the customers who come through their doors, said Jeff Stiely, a retail consultant at Kurt Salmon Associates in Atlanta. "We're in a pretty over-stored market right now," Stiely said.

ShopKo Stores, Inc., a mass-market retail chain in Green Bay, Wis., won't store detailed POS transactions when its first merchandising data warehouse goes into production in April. But market basket data is due to be added next year, project manager Tom Burzinski said.

That "will easily push us over the terabyte level" in data, compared with a starting point of 400G bytes, Burzinski said. It also will mean a multimillion-dollar investment, but there is "no question" ShopKo needs the analysis capabilities that transaction data will bring, he added.

Even much smaller companies are heading in the same direction. Kinko's, Inc. plans to load POS data into its warehouse this year, which will increase the warehouse size from 20G to 150G bytes. "We don't have 50,000 [items] like bigger retail stores, but we have the exact same issues they do," said Tracey Adams, strategic information manager at the Ventura, Calif., business services and products vendor.

Packaged data warehouse tools are still in their infancy. Page 43

Data marts get package deal

By Craig Stedman

WAKING UP TO data warehousing, Informix Software, Inc. this week plans to join the crowd of vendors that offer packaged software bundles for building starter warehouses or data marts.

Informix's FastStart bundles the company's databases and MetaCube analysis tools with World Wide Web server software and consulting services.

Data marts are small-scale warehouses that hold a subset of a company's historical information or are used by individual departments.

FastStart is a precursor to a planned April announcement of Universal Warehouse, a larger-scale package that will blend Informix's new object-enabled Universal Server, MetaCube and parallel database technology.

IBM and Sybase, Inc. already sell data mart bundles, and Oracle Corp. said it will announce long-promised packages in March. The bundles combine tools that users previously had to buy and install separately.

Unlike its rivals, Menlo Park, Calif.-based Informix isn't including tools for extracting data from production databases, a key part of warehousing projects. But that may not be a drawback, said Tracey Adams, strategic information manager at Kinko's, Inc. in Ventura, Calif.

Extraction tools "may add a cost to the package for something that people maybe aren't that interested in," Adams said.

Kinko's wrote its own Cobol extraction programs for its Informix-based data warehouse.

Informatica improves warehouse links

By Craig Stedman

INFORMATICA CORP. is opening up the metadata repository in its PowerMart data mart software to let users directly access explanatory information from desktop query tools.

The Menlo Park, Calif., company also plans to announce next week that it has signed on eight developers of query tools to support its Metadata Exchange (MX) Architecture programming interface.

Metadata can help point end users to the right files in a data warehouse or reduced-scale data mart. But links between metadata repositories and end-user query tools are limited, which forces information systems departments to stitch together less seamless access methods.

For example, Canada's agriculture ministry faced the prospect of providing users with paper descriptions of the metadata in an upcoming data warehouse for a savings program for farmers. Because metadata changes frequently, "we'd constantly be having to send the users new reports," said Mark MacIver, a technical architect at the Winnipeg, Manitoba-based department that runs the program.

"Ultimately, we want it all tied up in the end-user tool so people will be able to find out if the data is OK before they cut a report," MacIver said.

However, Donald DePalma, an analyst at Forrester Research, Inc. in Cambridge, Mass., said it isn't clear whether Informatica "has enough oomph to drive this" into wide usage. PowerMart, which extracts production data and massages it for warehousing, shipped last year.

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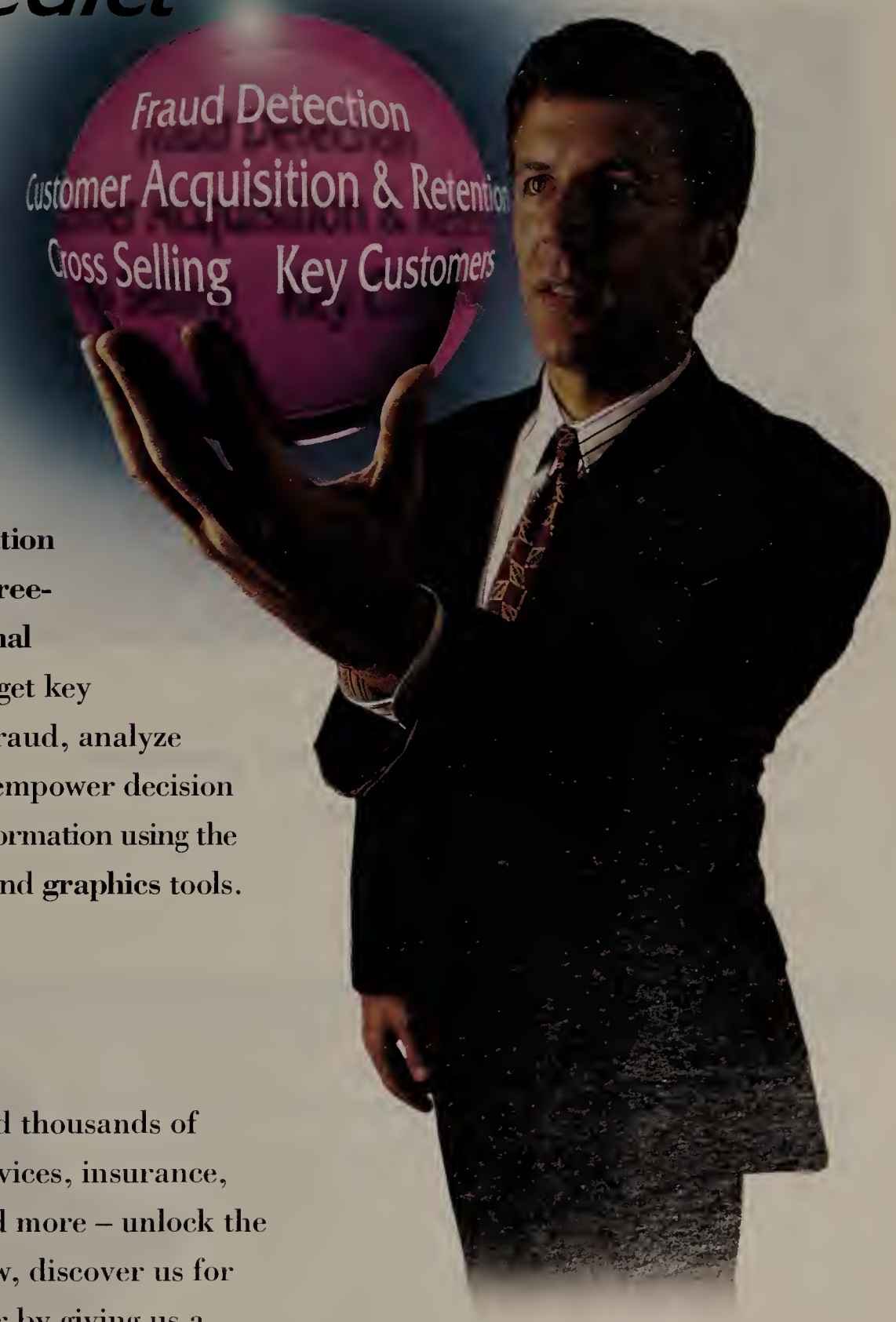

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NEWS

Users tune out buzz over 64-bit Unix

By Jaikumar Vijayan

IT WILL BE a long time before customers start crowding the road to full 64-bit architectures.

As Unix vendors once again prepare to peddle 64-bit operating systems at the Uniforum '97 show in March, user interest is muted at best.

The reason: The lack of a compelling, short-term need for that much horsepower, users and analysts said.

"I have not yet run into a wall that will make me say to vendors, 'Hey, if you don't go 64-bit, I can't go on,' " said Cliff Triplett, director of information systems at AlliedSignal Engine in Phoenix.

The promise of 64-bit computing is more speed, system memory and scalability — compared with current 32-bit systems — so businesses can run much larger applications without performance degradation.

"It is going to be a very important technology in a number of niches, but they are really going to be niche markets," said Greg Weiss, an analyst at D. H. Brown Associates in Port Chester, N.Y.

The niches include high-end imaging, chip design, seismic analysis, weather forecasting and space research.

What a 64-bit system offers:
Support for large file sizes, file systems, memory and faster processor.

What its benefits are:
Simplifies many database applications and data retrieval systems and helps run large applications much faster.

What its adoption means:
Little for most commercial users who don't immediately need large file size or large memory support. Dramatic performance boost for very large applications.

But mainstream corporate applications — even the huge reservation system for Hyatt Hotels — are far from needing 64-bit capabilities.

"A lot of these capabilities are going to be increasingly important down the road," said Scott Anderson, director of technology at Computer Sciences Corp., an outsourcing firm that runs the central reservation system for Hyatt Hotels in Oakbrook, Ill.

"But we have so far not been restricted by 32-bit [architectures]," he said. Hyatt has more than 1T byte of data in more than 40 databases.

Digital Equipment Corp. and Silicon Graphics, Inc. (SGI) currently offer what are widely regarded as the most complete 64-bit Unix systems. They include 64-bit hardware, operating systems and application support.

MONKEY SEE, MONKEY DO

Meanwhile, Sun Microsystems, Inc., Hewlett-Packard Co., SCO, Inc. and Data General Corp. also are developing 64-bit versions of their Unix operating systems.

Over the past year, those vendors have been adding 64-bit enhancements to their 32-bit versions. The enhancements include the following:

- Support for file sizes and file systems of at least 128G bytes. This is up dramatically from the previous average of about 2G bytes.
- Support for Very Large Memory. Some vendors support 30G bytes of RAM.
- Sixty-four-bit hardware that allows users to run 32-bit software much faster.

In addition, Digital and SGI offer full 64-bit addressability and large virtual memories that allow users to take better advantage of large memories and file sizes.

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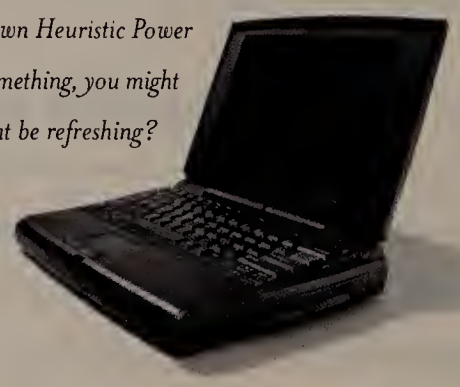

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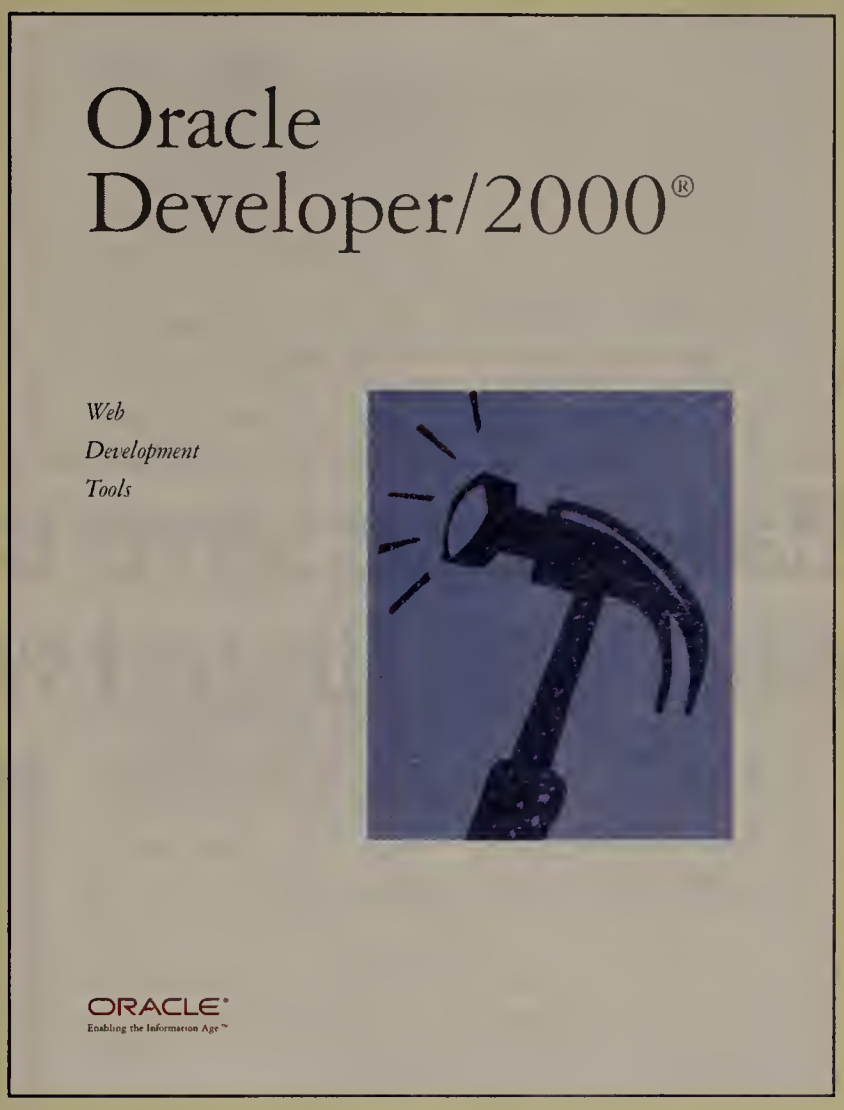

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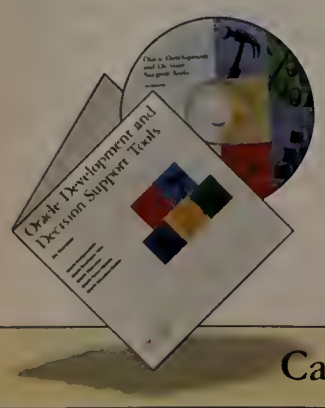

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NEWS

'97 won't be ATM's year

Expensive technology will play niche role on corporate network backbone

By Kim Girard

ANALYSTS AGREE THAT 1996 wasn't the year Asynchronous Transfer Mode (ATM) became the Swiss Army Knife of network services.

"I'm disappointed," said Charlie Robbins, a Sharon, Mass.-based consultant. "I give [ATM's progress] a 'C.'"

But experts predicted ATM will find a niche on the corporate network backbone, providing support for frame-relay data transmission services that have far surpassed ATM in market share.

"On the [wide-area network], ATM is a given," said Frank Dzubeck, president of Communication Network Architects, a consultancy in Washington.

ATM is "a chicken-and-egg [situation] at the moment. Carriers aren't moving as fast because demand isn't there." – Brett Azuma, Dataquest

"It's being adopted in droves," he said, because it offers scalability and Quality of Service guarantees that no other technology can match.

For most users, frame relay at 56K to 64K bit/sec. provides sufficient capacity at an affordable price. ATM targeted at bandwidth-hungry voice, data and video applications of 155M bit/sec. is overkill.

On the LAN side, applications are lagging, but that could change. Shipments of ATM LAN ports are expected to jump from 73,600 in the third quarter last year to 185,000 in the same quarter this year, according to the Dell'Oro Group, a research and consulting firm in Portola Valley, Calif.

But ATM faces a major challenge on the LAN switching side from Gigabit Ethernet. Analysts at Dataquest in San Jose, Calif., predict Gigabit Ethernet will become the technology of choice for desktop applications connected by switched 10M and 100M bit/sec. Ethernet.

But users continue to dabble with ATM, despite their anxiety.

"I question our choice every day," said Brian Stengel, workgroup leader at American Greetings Corp. in Cleveland, which uses ATM on a LAN. "We don't know enough about Gigabit Ethernet," Stengel said.

ATM remains too expensive for Mark Granzow, vice president of telecommunications at NationsBanc-CRT, a Chicago-based subsidiary of NationsBank Corp. "We're looking at ATM as the next step up," Granzow said. "We really haven't evaluated Gigabit Ethernet."

WAITING GAME

Alton Brantley, chief information officer at Medlantic Healthcare Group in Washington, agreed ATM pricing must come down before he will integrate it to practice telemedicine.

"We are watching it because there are certain kinds of applications that will need the bandwidth that ATM will deliver," Brantley said. He said he won't switch to ATM until equipment costs drop and the cost of hiring a long-distance carrier to manage the backbone is cheaper than managing it himself.

"It's somewhat of a chicken-and-egg [situation] at the moment," said Brett Azuma, a principal analyst at Dataquest. "Carriers aren't moving as fast because demand isn't there. It's still very expensive."

For example, a T3 port for ATM from AT&T Corp. costs $11,000 per month, compared with $2,200 for a TI port.

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Start-up eases server traffic with Gigabit Ethernet switch

By Kim Girard

USERS CONSIDERING Gigabit Ethernet technology can now use it to attack server-based bottlenecks.

Start-up Alteon Networks, Inc. in San Jose, Calif., this week will announce a Gigabit Ethernet server switch that it said can improve overall server performance by as much as 50%.

Alteon's AceSwitch was designed to work with the vendor's adapter cards to ease the upgrade from 100M bit/ sec. Fast Ethernet to Gigabit Ethernet.

The AceSwitch connects servers at speeds between 10M and 100M bit/sec. or at 1G bit/sec. when needed. The intent is to get traffic off servers faster — particularly during backups — to free up bandwidth on the backbone and improve network performance, company officials said.

In 1996, more than 80% of installed network connections were Ethernet ones, according to International Data Corp.

Don Miller, a chief analyst at Dataquest, a consultancy in San Jose, said Alteon's server line adds value to the corporate network by improving the performance of existing servers.

"Through these products, I can extend useful [server] life without having to buy another server at $250,000," he said.

Miller said Alteon made a smart decision to enter the Gigabit Ethernet fray on the server side — far from Cisco Systems, Inc. and other vendors, which are expected to hit the market with backbone switches.

"Why do you want to go into the middle of the battle if you're just going to get crunched?" he said. "No one is paying particular attention to this space."

Ray LaChance, president of RealTech Systems Corp. in New York, said Alteon's products, which include Gigabit Ethernet adapter cards used to connect to servers, could help improve network throughput without costly upgrades.

"We're backing up 20 servers in a night, and we're running out of network performance," LaChance said. He said the company currently taps speeds of 100M bit/sec. but expects future services will be much faster, so the Alteon migration path "makes sense."

But Brian Stengel, a workgroup leader at American Greetings Corp. in Cleveland, said he isn't so sure about Gigabit Ethernet. American Greetings uses Asynchronous Transfer Mode to back up the company's servers.

"I'm not ready to mention the word [Gigabit Ethernet] to my boss," he said.

The AceSwitch 110 with eight 10M to 100M bit/sec. Ethernet ports and two Gigabit Ethernet ports costs $8,995. It will ship next month. The AceNIC adapter pricing starts at $1,495 and also will be available next month.

LEAP OF FAITH

Gigabit Ethernet obstacles

- Standard won't be final until 1998
- Technology is still being tested
- High pricing
- A killer application for ATM may arise and steal potential Gigabit Ethernet migrators

Source: Dataquest, San Jose, Calif.

Intel preps laptop chip sets

By April Jacobs

INTEL CORP. hopes new modular designs for its chips and chip sets will help laptop makers move products out the door faster and incorporate new features.

The Santa Clara, Calif., company soon will release 150- and 166-MHz, Pentium-based modules that integrate common system elements. It also will introduce its 430TX Peripheral Component Interconnect (PCI)-based chip set and 380 Dock set. The products are aimed at mobile desktop users.

The modules, which should show up in laptops in the second half of the year, include a Pentium processor with multimedia-enhancing MMX technology, Level 2 cache, system clock and voltage regulator. They also include the 430TX PCI set, which is aimed at the desktop and mobile arenas.

But whether the chip modules will be well-received is another matter. Michael Slater, founder of the "Microprocessor Report" in Sunnyvale, Calif., said the modular design makes it easier to build laptops, but it requires them to be redesigned.

"If [hardware vendors] use the module, it takes away some of their ability to choose the chip set and the cache configuration they want," he said.

The 430TX PCI chip set was designed to enhance multimedia applications and provide Universal Serial Bus support.

Its 380FB Dock Set will extend 100M byte/sec. PCI support to docking stations and will add support for hot docking.

U.S. Robotics plans PalmPilot upgrade

U.S. ROBOTICS CORP. in Skokie, Ill., next month will release upgraded versions of its PalmPilot personal digital assistant.

Sources said one device will include electronic-mail capabilities and TCP/IP support for Internet access. Users of the device will be able to send and receive messages and synchronize messages with the user's desktop over any TCP/IP network. A lower-end device also will be released.

The upgraded Pilots will be better able to compete with handheld computers that run Microsoft Corp.'s Windows CE operating system, observers said.

"The Windows CE devices won't blow Pilot out of the water," said Andrew Seybold, an analyst and editor of "Outlook on Communications and Computing" in Boulder Creek, Calif. "The Pilot will stay strong because it offers what people want: a handy organizer."

— Mindy Blodgett

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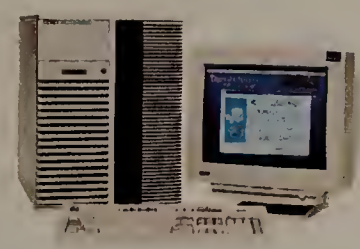

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NEWS

Tivoli beefs up security

▸ *TME suite to gain streamlined interface for controlling user access*

By Patrick Dryden

TIVOLI SYSTEMS, INC. last week unveiled plans to close the security gap in its TME 10 suite of systems management tools with a central console for controlling user access.

The current "hodgepodge" of administration tools demands expertise and attention to maintain security when adding, removing or auditing user accounts, information systems managers said.

SYSTEMS MANAGEMENT

A streamlined interface coming next month should help them apply corporate access policies to servers running Windows NT, Novell, Inc.'s NetWare or major Unix versions.

Austin, Texas-based Tivoli is also adding links to a range of security tools from 10 vendors and the Resource Access Control Facility (RACF), the main tool for MVS security from Tivoli parent IBM.

The combination will simplify daily access control chores through a single console that deals with users by groups or roles, differentiating the privileges of bank tellers from branch managers, for example.

Similar products for managing security across mixed systems are available from vendors such as Bull HN Information Systems, Inc. in Billerica, Mass., and Computer Associates International, Inc. in Islandia, N.Y., as well as some Tivoli/IBM partners.

"The significance here is that this tool comes from the people who brought you RACF," which has the largest share of the host security management market, said Mike Kahn, CEO of Clipper Group, Inc., an enterprise systems consultancy and market researcher in Wellesley, Mass.

IS managers seeking a unified approach to security management should be pleased to see Tivoli and IBM "bringing both houses together through their respective expertise," said Glenn Gabriel Ben-Yosef, president of Clear Thinking Research, Inc., a consultancy in Boston.

More than half of his clients have "discovered active user IDs for long-gone employees, especially those in test groups and project teams," Ben-Yosef said. "Overburdened administrators usually clean up these security holes in days, but many can hang around for months."

A top insurance firm is implementing TME 10 management tools and plans to test the security piece so it "can have one interface into the mainframe and all the distributed systems," said an IS manager at the firm who requested anonymity.

Tivoli's upcoming security manager gives administrators a single point of control over user access to diverse systems

"Right now, it's a hodgepodge. Every time someone joins or leaves the company, different operators have to handle accounts on the mainframe, the Unix systems and the Windows NT servers," the manager said. "Now, with one swing, we can hit all the platforms."

San Francisco-based Charles Schwab & Co. also is implementing TME 10 as a framework for "best-of-breed" management tools from Tivoli and other vendors.

"A big plus" is that TME 10 Security Management is based on "a favored tool" from Memco Software Ltd. in New York, said Geraldine Martin, director of security design and engineering at the Schwab Information Technology Enterprise group.

Martin said she likes seeing Tivoli/IBM partner with many vendors so Schwab can pursue a variety of security strategies.

MARKET STRATEGIES

Novell embraces NT for management

By Patrick Dryden

ACCEPTING THE reality of mixed networks, Novell, Inc. this week will introduce an option for its server management tool that lets administrators centrally control user access to Windows NT as well as NetWare resources.

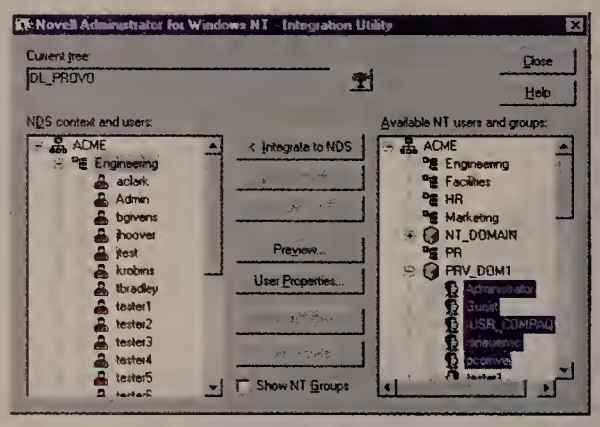
This will allow operators running the NetWare Administrator (NWAdmin) console to more easily keep up with the daily demand for adding, changing and deleting privileges for individuals or groups.

EXTENDING REACH

Novell's "homegrown" approach will undercut pricier options while extending the reach of its Novell Directory Services (NDS) — technology that is vital for keeping the Orem, Utah, vendor entrenched in corporate networks.

Although this is generally good news, Novell's support may be too little and too late for some NetWare users faced with the inexorable spread of NT servers throughout their organization.

At The Chase Manhattan Bank Corp., for example, administrators are already moving beyond basic user access control to take charge of desktop options and software distribution through value-added tool kits from vendors such as McAfee Associates in Santa Clara, Calif.



A new module for the NetWare Administrator tool lets managers support Windows NT server users through NDS

NO JUGGLING

Those users who want just the basic feature set by Novell must first install the free Novell Administrator for Windows NT module on NWAdmin and the coordinating software on NetWare and Windows NT servers. That will eliminate having to juggle access control of NetWare file-and-print services and NT application servers through two tool sets.

Incorporating Windows NT servers in the NDS tree with NetWare resources slashes the time and complexity required to support users in mixed networks, according to beta testers at Clemson University in Clemson, S.C., and the Florida State Department of Transportation in Tampa.

Some other products similarly combine administration of both environments, but their price tags start at $8,000 for 1,000 seats, for example.

Novell Administrator for Windows NT will offer essentially the same services.

Besides saving effort and expense, the option uses NDS to ensure reliability, through the fault tolerance and synchronization of the enterprisewide directory. It also provides security through its encryption of user passwords, Novell officials said.

Novell Administrator for Windows NT will be available for free download for the next six months from www.novell.com.

McAfee pushes workgroup management suite closer to enterprise. Page 49

OpenView users question role of Windows NT port

By Patrick Dryden

NETWORK MANAGEMENT leader Hewlett-Packard Co. this week will roll out long-awaited versions of its OpenView tools that run on Windows NT PCs instead of Unix systems.

The most important of the tools is Network Node Manager (NNM), which market analysts said remains the most widely implemented software for mapping and monitoring internetwork devices.

SOME DOUBTS

Beta testers report that the new platform option expands the tool's appeal by offering lower costs, easier operation and improved functions. But several OpenView users said they doubt NNM on Windows NT will do more than watch small networks and report to established Unix managers.

"This is a giant step in the right direction" despite some first-release weaknesses, said beta tester Frank Belland, a senior systems architect at the Enterprise Information Systems lab of Lockheed Martin Corp. in Bethesda, Md.

The Windows NT version can discover devices on the vast organization's IPX-based Novell, Inc. NetWare networks, as well as the usual Internet Protocol-based devices, Belland said. That saves operators the hassle of running separate management tools, he said.

But support for Microsoft's Open Database Connectivity standard is lacking in the initial release, due out March 1, Belland said.

Like its Unix counterpart, the NT version demands lots of power and memory to manage many devices, Belland said. "But at one-tenth the cost, we can afford to build more systems" that can manage local domains or forward information to a central point, he said.

HP did "an incredible job implementing the original functions on NT, but I wouldn't call this an equal replacement for the Unix platform," said beta tester Eric Jacobs, president of integrator InoTech of Virginia in Fairfax.

Officials at HP, in Palo Alto, Calif., claimed NNM on Windows NT can handle networks of many thousands of devices.

Pricing starts at $4,995 to actively monitor up to 250 devices. Additional 250-node increments are available for $1,995 each. The unlimited version costs $12,995.

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Netscape eyes enterprise

Firm introduces its first support program but increases software prices

By Justin Hibbard

CONTINUING ITS PUSH into the enterprise market, Netscape Communications Corp. last week introduced its first support program aimed specifically at large companies.

At the same time, Mountain View, Calif.-based Netscape announced that it expects customers — large and small — to pay more for its software.

Netscape's new five-tiered support program ranges from a plan for global companies to one for small businesses. The high-end service, which costs $125,000 and will be available next month, includes an engineer available around the clock by pager and four support contacts assigned to the customer.

The support program could give Netscape a much-needed image overhaul among corporate customers, analysts said. For large companies to feel comfortable deploying Netscape's products, Netscape must offer support that can rival that of traditional enterprise software vendors such as IBM and Hewlett-Packard Co., said John Robb, an analyst at Forrester Research, Inc. in Cambridge, Mass.

TECHNICAL SUPPORT

"Netscape in the past has had a bad reputation for customer service," he said. "They weren't providing developers with the proper support."

Netscape's support so far has been ad hoc, according to Frederick Woyack, senior staff engineer at Lockheed Martin Corp. in Reston, Va. Woyack said Netscape's spotty support has made his division hesitant to integrate Netscape software with its systems.

"Right now, we're underusing these tools," Woyack said. "But they have the kind of hooks in there that you can make this part of your information architecture, and that's when you're going to get some payoff from these things."

PRICES ON THE RISE

But the tools are going to cost more beginning April 1. By then, Netscape plans to release final versions of its Enterprise 3.0 World Wide Web server and SuiteSpot 3.0 suite of nine servers. SuiteSpot 3.0 will cost $4,995, up from $3,995 for SuiteSpot 2.0. A stand-alone version of Enterprise Server 3.0 will cost $1,295, up from $995 for Enterprise Server.

Netscape also plans to offer its Communicator client software for $59, up from $49 for Navigator 3.0.

Netscape officials said the price increases reflect features added to the products.

Becky McDonald, manager of messaging and Web infrastructure at US West, Inc. in Boulder, Colo., acknowledged that Netscape's new products include new functionality. But whether the price increases are justified depends on whether the products increase US West's revenue, she said.

"I would look at it from the standpoint of, 'Does it add to our bottom line?'" she said. "We don't buy software on the basis of fancy new features."

& A new study suggests that Navigator may be waning, but gives a murky market picture. Page 59

INGREDIENTS OF AMBROSIA

- Any Java-capable client
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- Optional plug-ins include message formatting, load balancing and third-party applications
- Security includes authentication, access control and digital signatures

Internet applications will get a taste of 'Ambrosia'

By Tim Ouellette

OPEN HORIZONS, INC. is readying general-purpose middleware that simplifies creation of Internet business applications that tie in to legacy hosts.

The South San Francisco, Calif.-based company is testing Ambrosia, which runs over TCP/IP, uses Java as its only client software and offers simple setup and management.

Messaging middleware products let applications on different platforms exchange secure, asynchronous data messages and avoid complex communications programming.

Ambrosia extends these capabilities to become an event management system for the Internet or for intranet applications, using a publish/subscribe format.

For example, Commerce America, Inc. in Pleasanton, Calif., uses Ambrosia to let users who subscribe to its auction service know about new products.

"We looked at middleware [for security] because of issues with online transaction processing on the Internet," said Jay Raimondi, president of Commerce America.

Ambrosia sends data messages only to applications that subscribe to the subject area via Java applets.

Other middleware packages that use publish/subscribe, or "push" technology, broadcast one message to everyone, requiring the client software to determine whether the user is interested in that subject, said Anne Thomas, an analyst at Patricia Seybold Group in Boston.

QUICK CREATION

With Ambrosia's simple approach and fast Java development, Mercury Technologies, Inc., a Wall Street systems integrator in New York, quickly created working prototypes of secure financial applications for the 'net, said Philip Meese, Mercury's director of technology.

Ambrosia costs $5,995 for Message Broker software, a client application programming interface, an administration console and one year of product support. It will ship by midyear.

Ford extranet targets loyalty

CONTINUED FROM PAGE 1

ant, convenient and efficient," said Jerry Peterson, director of marketing and sales systems at Ford. "Today, this kind of information resides in books. It's there, but it's not readily accessible. So this is a significant support tool for the salesperson."

FocalPt is the latest in a series of broad Internet initiatives in the automobile industry.

Automakers and dealers were early adopters of Internet technology; dealers began to go online more than two years ago to sell and promote cars. An automotive association last year announced the Automotive Network Exchange, a plan to link the intranets of Chrysler Corp., General Motors Corp., Ford and several thousand manufacturers, suppliers and other business partners. That service was scheduled to begin this year.

NEED IS THERE

John Anderson, a computer director at Framingham Ford, a dealership in Framingham, Mass., said dealers use mostly character-based systems for order entry and other back-office applications. He said dealers have a great need for more up-to-date, easy-to-use technology. Car salespeople and other staff members are often computer-illiterate, he said.

"You have a lot of personnel who do not have a clue how to use these older, third-generation computer tools," Anderson said. "The hidden costs are amazing for the dealers."

Ford hopes to change that with its extranet. Before a sale,

The FocalPt system will offer promotional, inventory and financial information designed to help salespeople close a deal.

car salespeople will be able to use workstations that run World Wide Web browsers to present sales and promotional literature — including video clips — and help prospective customers obtain financing. Afterward, dealers will be able to use the system to keep track of repair records and customer preferences, such as whether a customer can come in only before 9 a.m. or needs transportation after dropping off his car.

The nationwide network of repair information will be useful to customers whose cars break down on road trips. A customer from New York whose car breaks down in Iowa will find that the local Ford dealer has his car's complete repair history.

Extranet pilot slated

FocalPt is scheduled to be deployed as a pilot project in the second quarter, and Ford eventually hopes to roll it out to all 5,000 dealerships in the U.S. as well as thousands more overseas.

Dealers won't be required to join, and the company hasn't lined up pilot sites, but it doesn't expect to have any problems winning dealer acceptance. Dealers are, as a rule, independent businesses not owned by Ford.

Ford designed the network and will provide the back-end connections.

Dealers will buy the systems from any of three systems integrators: The Reynolds and Reynolds Co. in Dayton, Ohio; Automatic Data Processing, Inc. in Roseland, N.J.; or the Ford Dealer Computer System unit of Universal Computer Systems, Inc. in Houston. Each dealership will receive a PC server running Windows NT, Microsoft Corp.'s Internet Information Server and as many multimedia desktop PCs as they need. The desktops will run Microsoft's Internet Explorer browser.

The dealer systems were designed by SoftAd, Inc. in Mill Valley, Calif.

Communication between the dealers and Ford will be through FordStar, a satellite-based TCP/IP network that already exists for transmitting business information between Ford and its dealers. Information is distributed using Internet middleware from Wayfarer Communications, Inc. in Mountain View, Calif.

— Mitch Wagner

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70 Mining/Construction/Petroleum/Refining/ Agriculture
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23. Dir./Mgr. Sys. Development, Systems Architecture
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12. Vice President, Asst. VP
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(c) OS/2 (g) Windows
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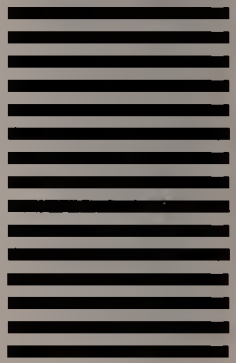

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Autonomous agents promise productivity gains

By Robert L. Scheier

YOU CAN'T BUY "agent" software to manage your network, link legacy applications or translate speech into computer commands . . . yet.

But leading-edge information systems managers and researchers are keeping a close eye on agents, a catchall term for software that does its job more independent of human intervention than most code. If agents fulfill their promise, within several years they could solve problems for both IS managers and the users they support.

The potential uses for agents drew an overflow crowd of 400 to the First International Conference on Autonomous Agents earlier this month in Marina Del Rey, Calif.

Officials from Netbot, Inc. in Seattle demonstrated agents that automatically comparison-shop on the World Wide Web. A NASA researcher described how agent software could help space probes repair themselves with less help from ground-based controllers. Extempo Systems, Inc. in Santa Clara, Calif., sold customizable agent-based animated characters to host online services.

Agents can do the following:

- Recognize gestures and speech
- Search for information on the Web
- Untangle network traffic jams
- Link legacy applications

For IS, the most critical uses of agents may be far less glamorous. Several IS managers hope to use agents as a "wrapper" around legacy systems. The agents would mask the complexity of older systems and allow them to share data with other systems.

That prospect is tempting but still far off for Steve Laufmann, a research scientist at US West Communications, Inc. in Boulder, Colo. With the deregulation of the telephone industry, US West and other regional telephone companies must allow new local service providers, such as AT&T Corp., access to their legacy systems. "It is very difficult for us to adapt our legacy systems . . . for our own internal purposes," much less give competitors access while maintaining the proper levels of security, he said.

One study completed by his group estimated it would take about a year to create such an agent-based wrapper for one legacy application. But for such wrappers to find widespread use, any other applications sharing data with them would have to use the same wrappers. "Technically, it's not a problem," Laufmann said. "Organizationally and economically, that's the problem." However, two researchers at the Oregon Graduate Institute of Science & Technology already use agents to bridge a Windows speech- and pen-based user interface to a Unix-based battle-planning system. Agents that operate in the application interface combine speech and pen input with natural-language processing capabilities so a user can create a simulated force of enemy tanks by pointing to a map and saying "Create T-72 platoon." Other agents translate those commands into systems calls that the Unix server can understand.

The same type of autonomous agents designed to help the New Millennium Deep Space One spacecraft repair itself also could help remote nodes on a network resolve network traffic jams, said Barney Pell, a senior computer scientist at the NASA Ames Research Center at Moffett Field, Calif. In either case, he said, the agent has to "diagnose the situation . . . and reconfigure a system" when its performance drops.

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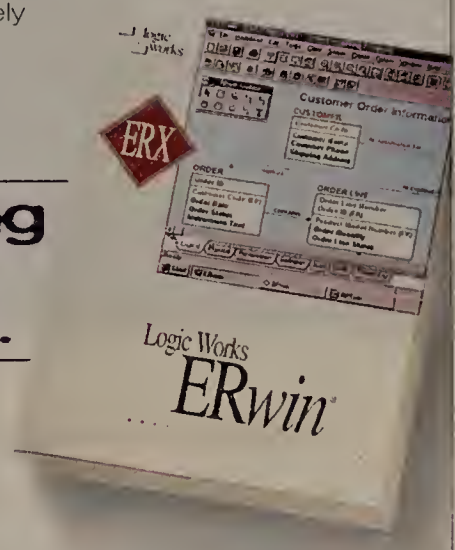

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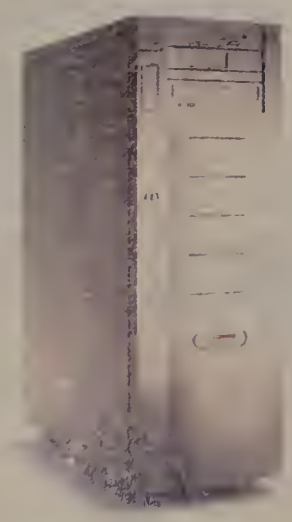

COMPAQ

IBM takes risk out of CISC decision

By Tim Ouellette

IBM HAS MAPPED out a RISC-based future for the AS/400 midrange system, but CISC users can rest easy that their machines will have some support over the next few years.

At the same time, interviews with six users who installed RISC boxes reveal that IBM is paving a smooth road for those who decide to take the plunge.

For AS/400 shops, the availability of RISC machines sets up a classic choice between sticking with older, but reliable hardware or shelling out money for better performance and lower maintenance costs.

IBM officials have confirmed that although Version 3 Release 2 of OS/400 — the CISC version of the operating system — will be the last full CISC release, IBM will continue to add minor features and support for new peripherals.

More importantly, the Armonk, N.Y., company also plans to extend the official support period deadline for Version 3 Release 2 from October 1998 to well past 2000, officials said.

This is good news for a majority of the AS/400's estimated 16 million users who still run applications on CISC machines.

"We have decided to shelve the RISC upgrade to next year," said one user who wished to remain anonymous. Though the upgrade is inevitable, he said the company isn't moving to RISC yet because of budget constraints, a stable business situation and additional room on the CISC box to add processing power.

Observers said the move to high-performance RISC models is crucial as IBM pushes the AS/400 into the mainstream of commercial servers.

This requires better price/performance ratios to compete with Windows NT and Unix boxes, 64-bit processing and large memory storage capacities — all best provided on the RISC platform.

IBM officials say nine out of every 10 AS/400s bought are RISC machines

For example, Enterprise Rent-a-Car Corp. in St. Louis upgraded 18 AS/400s to RISC over a period of two months without serious impact.

"We were performance-driven in our move to RISC," said Mark Cohen, a senior vice president at Enterprise. "I'll give IBM credit. [The migration process] was pretty much a nonevent to most of our users."

To make the migration even less risky, IBM plans this month to automate several manual processes in the Migration Assistant software that both slowed down the RISC migration and left the door open for errors.

The company will also deliver a new RISC-only version of OS/400, called Version 4 Release 1, later this year or early next year, along with a new line of 8- and 12-way RISC models [CW, Jan. 20].

It is in these multiprocessing machines that RISC will really shine.

"There are some performance advantages [with current RISC machines], but financial advantages won't be really realized until new models are available," said Al Barsa, president of Barsa Consulting Group in Port Chester, N.Y.

The rollout of new machines may leave some AS/400 shops recalculating their budgets as often as PC administrators.

The AS/400 used to have a five-year life cycle, which was easier to manage, said Barry Jones, a senior analyst at GameTime, Inc., an AS/400 site in Fort Payne, Ala.

"Now, there is only an 18-month to three-year life cycle with the AS/400, but we still have to deal with existing five-year leases," he said.

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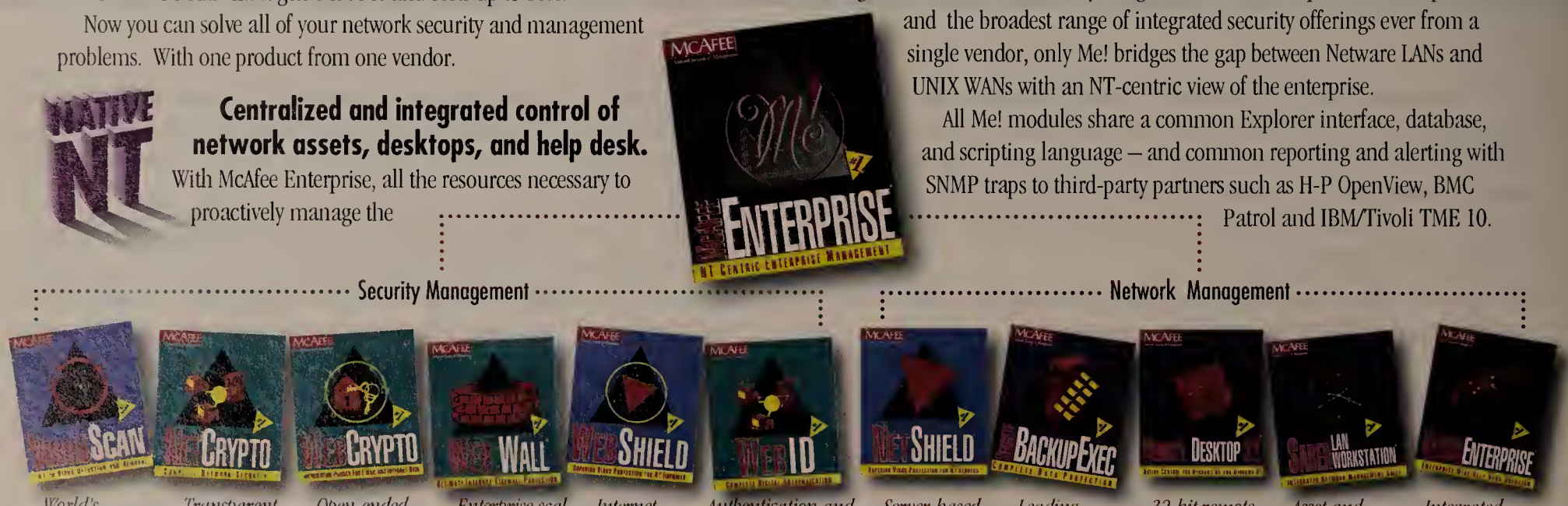

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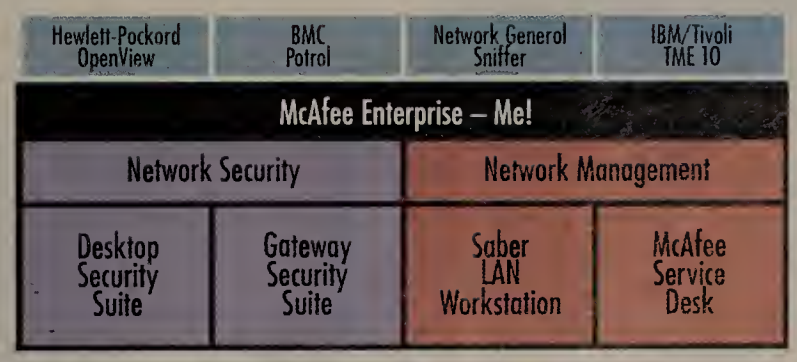

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Scholarships aimed at boosting IS diversity

▸ *KPMG wants IS professionals to become teachers, role models*

By Julia King

THE KPMG PEAT MARWICK Foundation plans to award $10,000 a year for the next five years to minority IS professionals willing to quit their jobs and enter information systems doctoral programs.

KPMG wants those with freshly minted Ph.D.s to remain on campus after they graduate to teach IS skills and attract more black, Hispanic and Native American students to the profession.

A key goal of the $250,000 scholarship program is to diversify the future IS talent pool.

But to attract more minority students to IS, there must be more minority IS professors, said Bernard Milano, executive director of the foundation in Montvale, N.J.

"The whole idea is to diversify the front of the classroom in order to diversify the classroom," he said.

One premise of the program is that businesses wouldn't have to spend so much on diversity training if students had more exposure to minorities in school.

"Companies are currently spending hundreds of millions of dollars annually on diversity and multicultural training because people can't work in teams with people of different colors and backgrounds," Milano said.

"JC Penney threatened to pull its auditing business [from KPMG] because of all the white males [on the account]. Its customer base is 90% multicultural women."

– Bernard Milano, KPMG Peat Marwick Foundation

"The entire concept is totally positive," said Cynthia Salinas, an education programs associate at the Hispanic Alliance for Career Enhancement in Chicago.

"Whether they end up teaching minority students or nonminority students, it's a great positive to encourage minorities to get their Ph.D.s in the IS field," she said.

FEW MINORITY PROFESSORS

Currently, there are only 32 minority IS professors out of 2,060 IS faculty members at 473 colleges and universities. The total number of minority IS doctoral candidates is 48, according to KPMG's research.

Among these is Ruben Mendoza, 30, who left an eight-year IS career at Procter & Gamble Co. last July to pursue a doctoral degree in computer and information science at the University of Michigan in Ann Arbor.

Mendoza will be eligible to apply for one of the KPMG scholarships, the first of which will be distributed in September. Applications are due by April 1.

It will take Mendoza five years to complete the program, after which he hopes to get a job as a university IS professor. During that time, he'll give up about $250,000 in salary he might have earned in the private sector.

"I like to think that when I get out and get a job, I'll be making about the same amount that I would be making if I had stayed on," he said.

"But the motivation to leave the corporate job and go back to school is definitely, most certainly not the money," Mendoza said. "It's more a feeling of accomplishment and a sense that you're actually doing something that is worthwhile."

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- (c) OS/2 (g) Windows
- (d) Unix (h) NeXTstep

App. Development Products ❒ Yes ❒ No
Networking Products ❒ Yes ❒ No
Intranet Products ❒ Yes ❒ No

4. Which of the following products do you buy, specify, recommend or approve the purchase of? (Check all that apply.)
- (a) ❒ Internet software
- (b) ❒ Internet browsers
- (c) ❒ Web authoring/development tools

5. Do you use the Internet? ❒ Yes ❒ No

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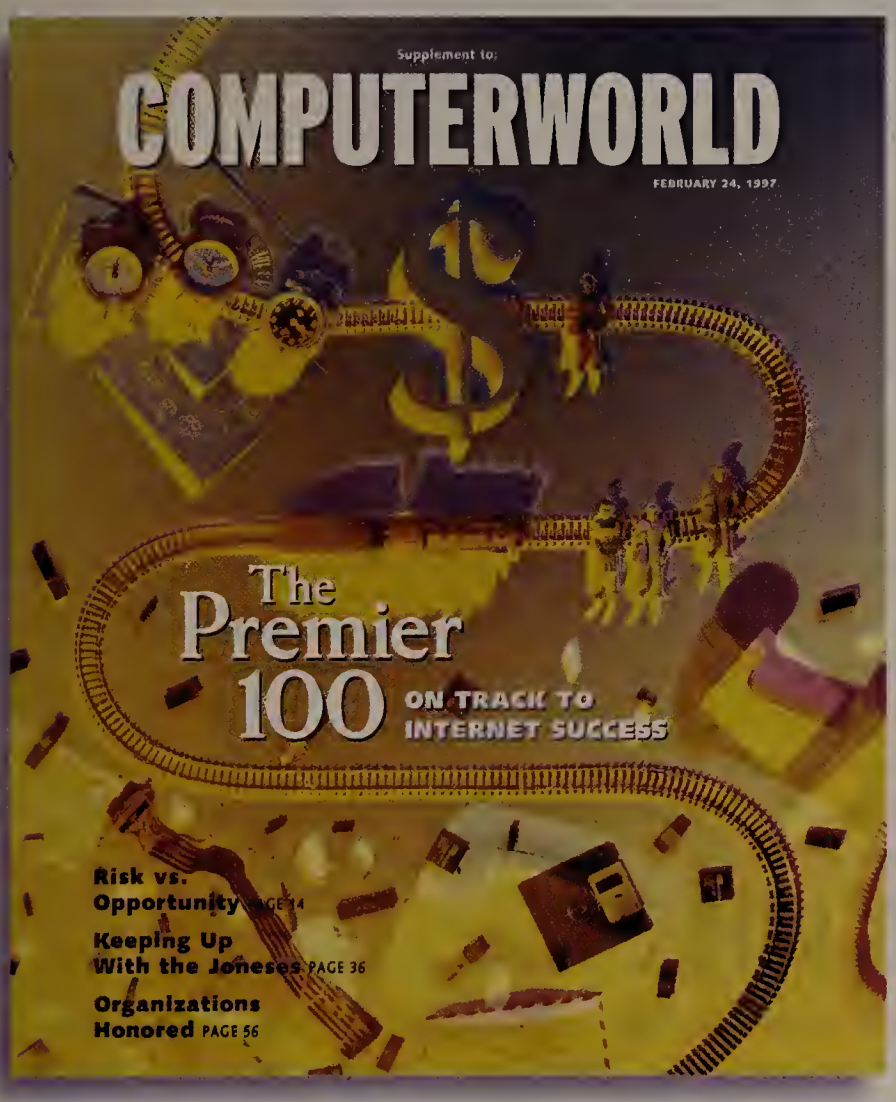

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Signatures draw security worries

CONTINUED FROM PAGE 1

The security of electronic autographs worries some users, and the chore of maintaining the images and related files is an extra burden for information systems groups.

Electronic signatures are digitized renditions of handwritten signatures that are made by using a plastic stylus on a computer pad. They aren't new. United Parcel Service of America, Inc. (UPS), for example, has asked package recipients to sign for deliveries this way since 1990. (see story below)

But end users and customers are surprising IS with their objections to rules about when and where to sign electronic documents. They fear such personal information could be abused by crooks who could, for example, access signatures online and copy them into fraudulent files or duplicate them on paper.

"People react on a gut level when you ask them to sign something. It's a personal thing. Putting their signature in a new place, like a computer, is jarring for some people," said Ben Wright, a lawyer in Dallas and author of *The Law of Electronic Commerce*.

Indeed, UPS faces new fears that its signature-capture system opens the door to con artists.

Even when personal identification numbers (PIN) are substituted for actual handwritten signatures, users still can be possessive, as Memorial Hospital in Modesto, Calif., has discovered.

The hospital lets 30 radiologists sign for online medical reports with a secret PIN. Originally, all radiologists could read and sign one another's reports, in keeping with the hospital's policy of doctors cross-checking colleagues' work.

But some radiologists weren't comfortable with that. They requested the application be changed so they could sign off only on their own reports, said Julie Vieira, manager of medical records at Memorial Hospital.

The doctors "worked out their own procedure among themselves, then came back to us to have it implemented," Vieira said.

Some IS shops have flat-out snubbed the use of electronic signatures.

"Someone could take a photocopy or duplicate a file and treat it as clip art," said Starr Smith, a resource analyst at Lawrence Livermore National Laboratory in Livermore, Calif. Instead, the lab uses an encryption package to encode data in documents and electronic mail. The package adds another layer of security: digital signatures.

The signature in this case isn't a computerized "John Hancock" but a unique, encrypted piece of code that verifies that a file hasn't been altered. (see chart)

Although the extra security in this kind of digital signature may lend peace of mind, it will also add IS overhead.

If these signatures — also known as certificates — catch on, IS groups will have to hire an extra worker or two to manage them, said Paul Callahan, an analyst at Forrester Research, Inc., a market research firm in Cambridge, Mass.

The same is true of electronic handwriting systems, according to Sharon Stamer, an operations officer at Provident Bank of Maryland. That's partly why the Baltimore bank rejected handwriting in favor of a PIN-and-password application it plans to roll out in the next few months.

A database of valid employee signatures "would have been one more thing [for IS] to maintain," Stamer said. End users keep their own passwords and PINs, however.

Elsewhere, network managers face unknowns related to bandwidth resources that could be eaten up as signature images are moved around the company. UPS, for example, doesn't upload signatures as often as it uploads other delivery data, partly to avoid depleting its resources.

IS should treat signatures different from other company data, especially when the autographs are those of customers, said Beth Givens, a project director at Privacy Rights Clearinghouse, a privacy advocacy group in San Diego. A warehouse of signatures sitting somewhere on a company network makes some customers nervous even if a company promises to protect it, Givens said.

"Creating a central repository might not be the best idea, even if it will be convenient for the IS application," she said. Instead, Givens advised users to move signatures after five to seven days to archive tapes that can't be accessed by the company network or potential hackers.

Furthermore, the technology isn't exactly smooth as silk, said Robert Daniels, an attorney and adviser to the U.S. Social Security Administration in Baltimore.

One package the agency evaluated required users to build a "memory" of signatures so it could recognize which ones were valid. "Can you imagine a clerk at a Social Security office asking a disabled person to sign their name 40 or 60 times?" Daniels asked.

ERIC MILLETTE

Memorial Hospital's Julie Vieira: Don't roll out electronic signature systems to off-site locations at first. "You want a small, local control group so you hear about the problems right away."

DEFINING MOMENT

There are differences between electronic and digital signatures

Electronic signatures: Computerized captures of your autograph. Signers write their names on a digitizer pad by using a pointed stylus that resembles a pen.

Digital signatures: Encrypted chunks of code attached to electronic mail or documents to verify that the data came from a particular person or company. They also prove that documents haven't been altered in transit over the Internet.

COMPUTERWORLD

- **For these and other related links, point your browser at: www.computerworld.com/news/970218siglinks.html**

Digital Signatures Standard: http://bilbo.isu.edu/security/isl/fips186.html

FAQ: www.ameritech.com/civiclink/digsig.html

PRIVACY DEBATE

UPS insists signature data is safe

Kim S. Nash

DESPITE A RECENT dust-up over privacy concerns, UPS doesn't plan to stop customers from accessing and downloading signatures of people who sign for packages.

The courier offers those who use of its proprietary package-tracking software the ability to view and print the signatures of people who sign for deliveries. This saves customers time by solving disputes faster, UPS officials said. But privacy advocates worry that bit-mapped images of people's signatures will be bought, sold and possibly forged.

LARGER SCALE

Although people could collect signatures before — by snatching a credit-card receipt left on a restaurant table, for example — the UPS application enlarges the scope of potential wrongdoing, said Lauren Weinstein, moderator of the "The Privacy Forum," an electronic mailing list.

To gain access to signatures, UPS customers don't need to argue any special need or emergency. The images are available by typing a few commands in to UPS's proprietary tracking software. "It's a matter of time before some operator approaches a large UPS shipper and makes a deal," Weinstein said.

For example, he said, a marketing firm could offer to handle a company's package-delivery confirmations while building a database of signatures.

UPS officials insist the company knows what it is doing and that data is protected.

"We've been capturing signatures and information related to delivery since 1987. We're aware of the issues," said John Nallin, vice president of corporate repositories and architecture at UPS in Mahwah, N.J. Initially, the paper signatures were scanned; direct electronic entry began in 1990.

Customers who are concerned about privacy can try to work out a special arrangement with the company, Nallin said.

Signatures are kept for a year in an IBM DB2 database and then shunted to optical storage for another six months. UPS said its database, which is protected by IBM's RACF security package, is guarded well from intruders.

UPS hasn't decided whether to offer signature viewing over the World Wide Web, which would raise many security-conscious eyebrows. "Our marketing people [will decide] if it's appropriate," Nallin said. Some large customers, such as pharmaceutical companies, run leased lines into the UPS data center. But most others dial up. An Internet connection would be cheaper for some customers.

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Computer Industry

Briefs

Banyan names CEO

William Ferry

Banyan Systems, Inc. in Westboro, Mass., last week named industry veteran William Ferry president and CEO. He replaces company founder David Mahoney, who resigned in November. Ferry most recently was president of the $800 million Services Division at Wang Laboratories, Inc. in Billerica, Mass. Prior to that, he spent 12 years at Digital Equipment Corp. in Maynard, Mass., where he held a variety of executive positions, including vice president of Digital's Enterprise Integration Services group.

Unify warns of red ink

Unify Corp. in Sacramento, Calif., warned that revenue for the quarter ended Dec. 31, will be about $2.5 million. Unify, which makes client/server application development tools and database management software, will show a loss for the quarter of approximately $8 million. The company attributed some of the loss to a contract reversal in China.

Netcom losses mount

Internet service provider Netcom On-Line Communications Services, Inc. in San Jose, Calif., reported quarterly revenue of $36.3 million for the quarter ended Dec. 31, up 85% from the same quarter in 1995. But Netcom lost $11.4 million during the quarter, more than last year's $5.4 million.

FileNet posts 1996 loss

Enterprise software vendor FileNet Corp. in Costa Mesa, Calif., announced a net loss of $2.6 million for fiscal 1996, compared with profits of $8.2 million in 1995. Annual revenue rose 17%, from $229.4 million to $268.9 million. In the fourth quarter, FileNet posted net profits of $3.2 million, compared with $5.2 million in profits in fourth-quarter 1995.

Client/server sales shoot up

By Randy Weston

CLIENT/SERVER application vendors continue to enjoy rapid growth and strong software sales, despite an increasingly crowded market and competition from other technologies.

That is partly because companies are turning to client/server upgrades to solve year 2000 problems and meet global competition demands. For example, they are buying software that can handle the European conversion in 1999 to a single currency, analysts said.

Market leader SAP AG in Waldorf, Germany, posted strong year-end results. So did other top players, including The Baan Co. in Ede, the Netherlands, and PeopleSoft, Inc. in Pleasanton, Calif. Redwood Shores, Calif.-based Oracle Corp. — second in the market — is expected to round out the roster when it posts its third-quarter results next month.

Financial and industry analysts said there is still plenty of room for client/server growth in the Fortune 500 market and the relatively untapped midsize and small markets — those with less than $1 billion in sales.

"When you look at the Fortune 500 market, about 40% have made [client/server software] purchases," said Neil J. Herman, applications equity analyst at Salomon Brothers, Inc., a brokerage in New York. "Of those, only 40% are fully penetrated with implementations. The reality is there is a heck of a lot of room in the top tier."

Herman said companies are finding packaged client/server applications to be an easier solution to their technology problems than alternatives such as rewriting code in-house to solve year 2000 problems.

"Companies are increasingly realizing that their MIS departments are really good at buying technology as opposed to developing it in-house," Herman said. "When you buy packaged applications, the chances of a successful project are significantly higher than internally developing the solutions."

Year-end financials for major enterprise application vendors

	SAP*	Baan	PeopleSoft
1995 revenue			
Total	$1.74B	$216M	$232M
Software	$1.06B	$112M	$138M
1996 revenue			
Total	$2.39B	$387M	$450M
Software	$1.52M	$224M	$138M
1995 profit	$260M	$15M	$27.3M
1996 profit	$365M	$36M	$35.6M

*SAP results were released in deutsche marks; U.S. dollar amounts are based on the Dec. 31, 1996 exchange rate of $1 U.S. per 1.5548 deutsche marks

INTERNET CONVENIENCE

Also driving sales is the Internet, which, ironically, was once called the death of client/server.

Clare Gillan, an analyst at International Data Corp. in Framingham, Mass., said small firms consider Internet technology an inexpensive and convenient way to deploy client/server software to more users with fewer per-user software licenses.

The trend is expected to continue. The Yankee Group, a research firm in Boston, predicted that sales of enterprise applications will grow 29.5%, from $6.1 billion last year to $7.9 billion this year.

Resignations, write-off shake Apple

By Stewart Deck

APPLE COMPUTER, INC. last week announced that it will have to absorb two big losses — one monetary, the other human.

Apple this week revised the cost of its acquisition of Next Software, Inc., from $400 million to $430 million. That figure will show up in the current quarter's accounting cycle as a $322 million write-off, the company said.

Apple's Heidi Roizen

Vice president of developer relations resigns

At Apple's recent stockholder's meeting, Chairman and CEO Gilbert F. Amelio said Apple might return to profitability by late this year.

But the Cupertino, Calif.-based company said last week in a filing with the Securities and Exchange Commission that its latest accounting move may mean the company won't turn a profit in this fiscal year.

To acquire Next, Apple paid $325 million in cash, issued 1.5 million shares of common stock, paid $5 million in transaction closing costs and assumed $55 million of Next's debts.

Apple's human loss is in the form of three vice presidents. Perhaps the most notable is Heidi Roizen, 38, the company's vice president of Developer Relations. She resigned this week after a year on the job. Roizen was hired to help persuade developers to continue building new applications for the Macintosh platform.

Two other vice presidents tendered their resignations last week: John Floisand, senior vice president of worldwide sales; and Fred Forsyth, senior vice president of Power Macintosh development efforts.

"In her tenure at Apple, Heidi greatly improved Apple's developer relations activities — taking them from a nadir in 1996 to the much healthier, more open and interactive relationship we have today," said Guerrino de Luca, an executive vice president of Apple marketing.

David Wu, an analyst at The Chicago Corp., a consultancy in New York, said that while Apple continues to rearrange and reorganize, "it's a revolving-door executive situation over there with a certain amount of chaos going on."

Axil rolls dice on 8-way NT box

Axil Computer, Inc. in Santa Clara, Calif., a subsidiary of Hyundai Electronics America, today will announce its foray into the eight-way symmetrical multiprocessing (SMP) server market for Windows NT users.

Axil has been building SPARC-compatible workstations and servers since 1991, but it will have its hands full trying to compete against the three market leaders in the NT server world — Compaq Computer Corp., Hewlett-Packard Co. and IBM.

"They'll be a no-name company in this market ... with a technology that's outside the mainstream at this point and is unproven," said Joe Barkin, a research director at Gartner Group, Inc. in Stamford, Conn. "It'll be hard to make headway."

Barkin said that while Axil is positioning its technology to run Microsoft Corp.'s Windows NT, there is little evidence that NT servers can scale to eight processors. "A lot has to happen before eight-way becomes mainstream," he said.

— Matt Hamblen

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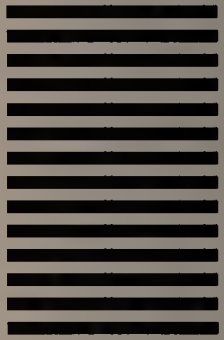

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PJ Matarese, Senior Analyst, Philips Semiconductors

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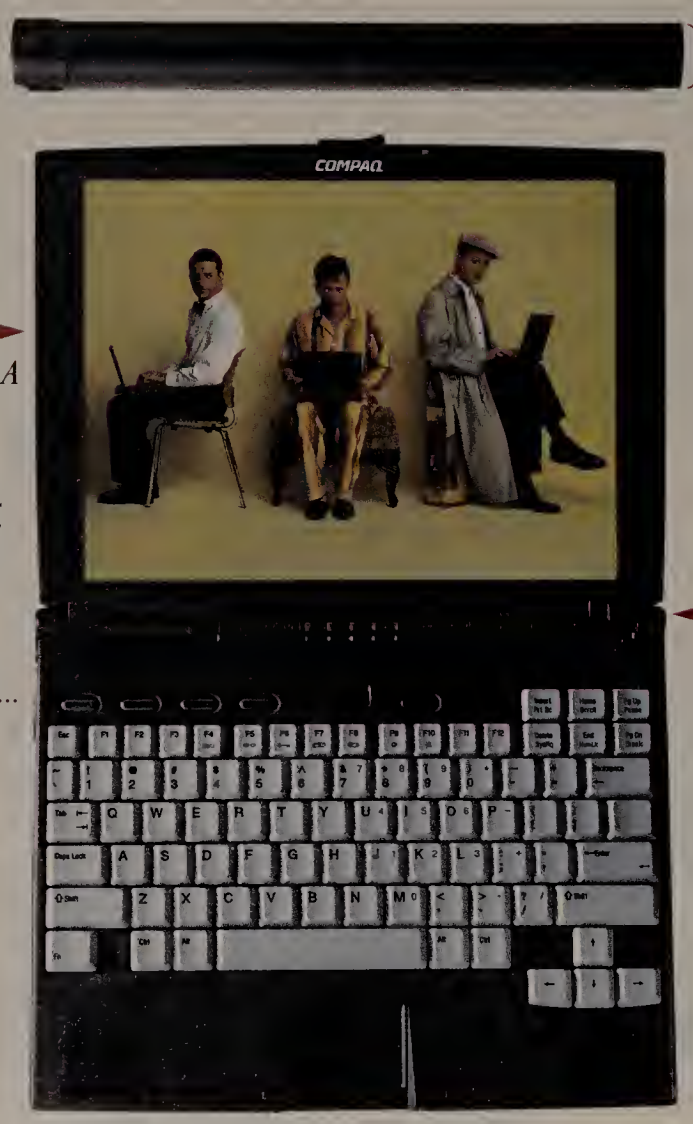

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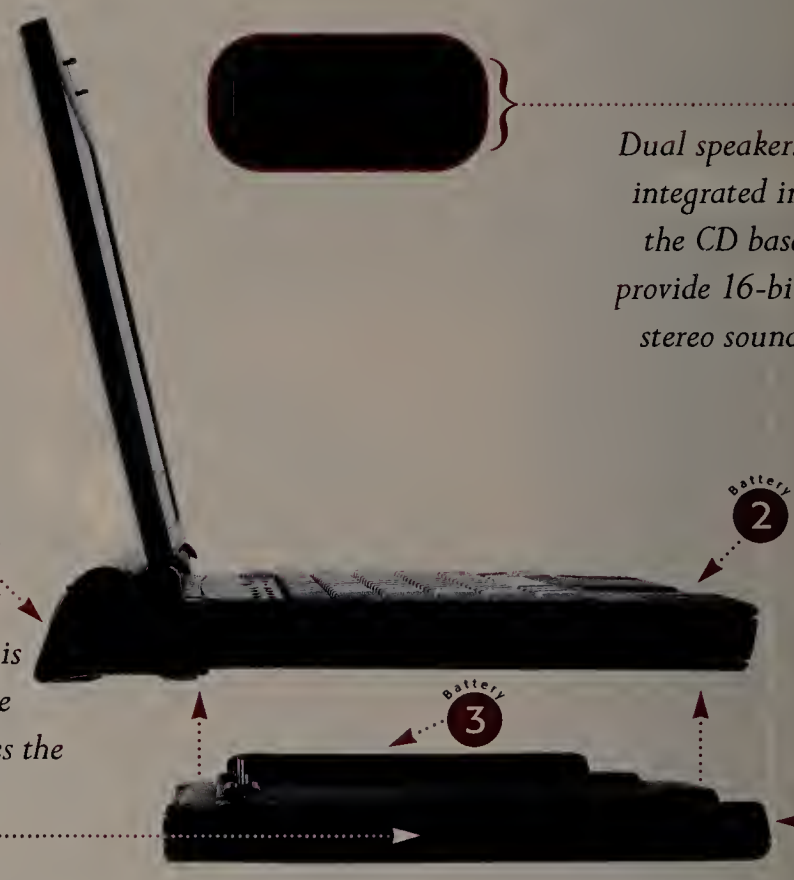

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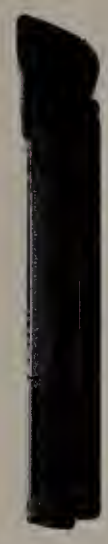

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Has It Changed Your Life Yet?

OPINION

Cloud cover Listening to Bill Gates spinning

tales about the wonders of Windows NT vs. Unix at a recent press conference, I had to wonder: Does he realize he's mistaken when he claims that NT's scalability today is "better than the most expensive Unix systems?" Or is the reality-distortion cloud really that thick around the world's richest PC software mogul?

"I think he really believes what he's saying," said one British bank CIO, who met with Gates in a small gathering at the World Economic Forum in Davos, Switzerland. "And, of course, who's going to argue with him?"

Well, let's take a stab at that here. High-end Unix servers scale up to 64 processors in real-world applications, while NT Server can hit somewhere between six and eight processors in the most optimistic scenario. A top-end Unix database engine can handle up to 1T byte of data, while NT's SQL Server would get pretty squeaky if you piled on, say, 100G bytes.

Now, it's absolutely true that NT is making a stunning showing for itself on the low end of the Unix workstation/server market, where NT Server licenses last year outpaced Unix licenses for the first time. And NT is certainly giving Novell's NetWare a respectable run for the money in the PC LAN space.

But in story after story, survey after survey, enterprise users say that when they need a highly reliable, stable, scalable, mainframe-class server system, they overwhelmingly choose Unix. That's why it was a lucrative $34 billion market last year [CW, Feb. 10].

By the time Windows NT catches up to where Unix is today — in everything from security to network performance to clustering capabilities — the game will have shifted upward once again to 64-bit computing, where Unix vendors also hold a commanding lead.

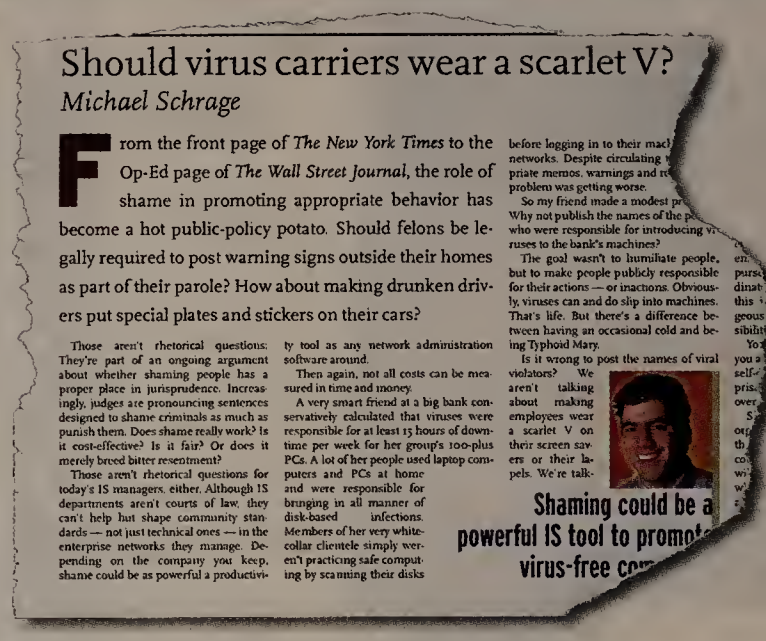
But as any sensible IS manager will tell you, Unix doesn't have to lose for NT to win. It's how well they can coexist and deliver business value that counts.

So watch out when Bill Gates invites you into his cloud of wishful NT thinking. And definitely don't inhale.

Maryfran Johnson

Maryfran Johnson, *Executive editor*
Internet: *maryfran_johnson@cw.com*

LETTERS


Should virus carriers wear a scarlet V?
Michael Schrage

From the front page of *The New York Times* to the Op-Ed page of *The Wall Street Journal*, the role of shame in promoting appropriate behavior has become a hot public-policy potato. Should felons be legally required to post warning signs outside their homes as part of their parole? How about making drunken drivers put special plates and stickers on their cars?

Those aren't rhetorical questions. They're part of an ongoing argument about whether shaming people has a proper place in jurisprudence. Increasingly, judges are pronouncing sentences designed to shame criminals as much as punish them. Does shame really work? Is it cost-effective? Is it fair? Or does it merely breed bitter resentment?

Those aren't rhetorical questions for today's IS managers, either. Although IS departments aren't courts of law, they can't help but shape community standards — not just technical ones — in the enterprise networks they manage. Depending on the company you keep, shame could be as powerful a productivity tool as any network administration software around.

Then again, not all costs can be measured in time and money.

A very smart friend at a big bank conservatively calculated that viruses were responsible for at least 15 hours of downtime per week for her group's 100-plus PCs. A lot of her people used laptop computers and PCs at home and were responsible for bringing in all manner of disk-based infections. Members of her very white-collar clientele simply weren't practicing safe computing by scanning their disks before logging in to their mac networks. Despite circulating priate memos, warnings and re problem was getting worse.

So my friend made a modest pr Why not publish the names of the p who were responsible for introducing vi ruses to the bank's machines?

The goal wasn't to humiliate people, but to make people publicly responsible for their actions — or inactions. Obviously, viruses can and do slip into machines. That's life. But there's a difference between having an occasional cold and being Typhoid Mary.

Is it wrong to post the names of viral violators? We aren't talking about making employees wear a scarlet V on their screen savers or their lapels. We're talk-

Shaming could be a powerful IS tool to promot virus-free co

Use incentives to fight the sabotage of virus writers

I JUST READ Michael Schrage's column on virus prevention, and I can understand why his friend's suggestion to post the names of virus "carriers" met with a cold reception ["Should virus carriers wear a scarlet V?" CW, Jan. 27]. Very few people understand the cost and lost productivity caused by computer viruses, and even fewer are objective enough to publicly own up to causing these losses.

Why not use pride rather than shame?

As an alternative to his proposal, why not use pride rather than shame as the incentive? His column reminded me of highway signs used to increase seat belt use in cars. These signs display the weekly percentage of seat belt use and the best percentage to date for that town or city. This gives the drivers a simple reminder to use seat belts and also gives them a goal for improvement.

Why not post a sign on each floor of the building? One could display the number of viruses found that month for that floor, their estimated cost to the company and the least number of viruses found to date on the best floor. This may create awareness of the cost of viruses and a little competitive spirit — all of which benefit the company.

Simon B. Walker
Systems manager
The Ryland Group, Inc.
Columbia, Md.

MICHAEL SCHRAGE is on target about shaming virus inflicters. But the whole problem would be a lot more soluble if we also called their behavior what it is: sabotage.

A virus impedes improvements because it removes the element of personal accountability for the damage created.

Robin F. Goldsmith
Needham, Mass.

Ignoring job injuries will hurt

I FEEL COMPELLED to reply to the letter from Dean Backhaus ["Carpal tunnel pain (if it's real) can be relieved," CW, Jan. 6] about repetitive strain injuries.

Backhaus states that most of the complaints seem to come from administrative-level folks who "in most cases seem very unhappy."

Gee, do you think maybe *you* would be very unhappy if you suffered agonizing pain every day in the course of doing your job?

People in IS don't generally suffer from repetitive strain injuries (of which carpal tunnel syndrome is merely the best known) because we have some variety in our posture, we spend as much time thinking as typing, and we often need to leave the keyboard to discuss matters with others.

Naturally, no company wants to admit that its employees are being injured by their jobs.

But companies that ignore the problem are eventually going to feel the pain where it really hurts — in their bottom lines.

Jim Larsen
Springfield, Mo.
ciao@juno.com

Computerworld welcomes comments from its readers. Letters shouldn't exceed 200 words and should be addressed to Maryfran Johnson, Executive Editor, Computerworld, PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701. Fax number: (508) 875-8931; Internet: letters@cw.com. Please include an address and phone number for verification.

February 17, 1997 Volume III, Issue II

COMPUTERWORLD

·*Leadership Series*·

From the Editors of Computerworld

By Jerry N. Luftman

Align in the Sand

How can you align technology and business despite ever-shifting strategies and endlessly changing technologies? Begin by examining where you are, where you are going and how you prioritize IT projects and investments.

and Al Gore have plenty to worry about: the federal deficit, foreign crises, welfare reform. Yet another issue is also regularly discussed in the Oval Office: IT alignment. Bruce W. McConnell, chief of the Office of Management and Budget's Information Policy and Technology Branch, annually meets with the president and vice president on how to ensure that the federal government is investing appropriately in IT.

Alignment is an issue that seems to always grow in importance. Decades have passed. Billions of dollars have been invested. Still, alignment — applying information technology in an appropriate and timely way, in harmony with business strategy, goals and needs — remains the key concern of business executives. Frustratingly, organizations seem to find it difficult or impossible to harness the power of IT for their own long-term benefit, even though there is worldwide evidence that IT has the power to transform whole industries and markets.

How can companies achieve alignment? We know the enablers and inhibitors that help and hinder alignment. IS executives experience them daily. What we are finding so hard is strengthening the enablers and minimizing the inhibitors in the midst of constant change. The endless, quicksilver shifting of business strategies and technology make aligning them as difficult as surveying sand dunes in the Sahara.

There is no silver bullet for alignment. However, practitioners and researchers have found ways to look at alignment and turn these insights into action items.

Enablers and Inhibitors

IBM's Advanced Business Institute in Palisades, N.Y., has been studying alignment for years. Since 1993, three researchers — Thomas Brier, a consulting instructor at the institute, Raymond Papp, an associate professor at Central Connecticut State University in New Britain, Conn., and myself — have assessed over 500 companies on strategic alignment. Both IT and non-IT executives were asked to identify and rank the top enablers and inhibitors of alignment.

The results provide a surprise: Alignment is not about vision statements (see chart below). It is not even about the goals that IS and non-IS executives are striving to attain. (The respondents did not consider clearly defined goals to be much of an enabler, while the lack of a goal did not score high as an inhibitor.)

Instead, alignment is about process. It's about what management *does* to achieve its IT goals.

According to the respondents, support from top non-IS executives and strong leadership from IS executives are the most important enablers. Non-IS executives are well aware of the importance of executive support for IT. In fact, they rated it higher than IS executives.

Strong IS leadership, judging by the survey results, means helping to develop the business strategy and selecting IT priorities. IS leaders must focus on recognizing business problems and proposing IT solutions. They must also identify specific opportunities and discuss them with the management team in terms they can understand. This is no different from what is being asked of all functional managers. Marketing, manufacturing and financial executives are continuously asked to recognize problems and opportunities and propose solutions using their respective expertise. Why should IS be any different?

Executives recognize that it is easier to keep aligned when the appropriate cross-functional executive team (including IS) is involved in creating strategy. This participation must be earned day in and day out. That requires continuous relationship building by effectively communicating, listening, negotiating and marketing IT in terms that the business can appreciate.

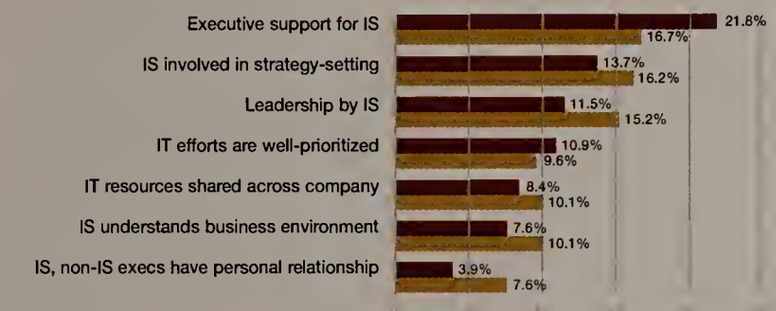
And the inhibitors? Some of them are just the inverse of the enablers.

Poor prioritization of IT efforts and the lack of relationship between IS and non-IS executives were the top two factors preventing alignment. IT executives, who believe that they are left hung out to dry without support, overwhelmingly rated "no close relationship" as the No. 1 inhibitor.

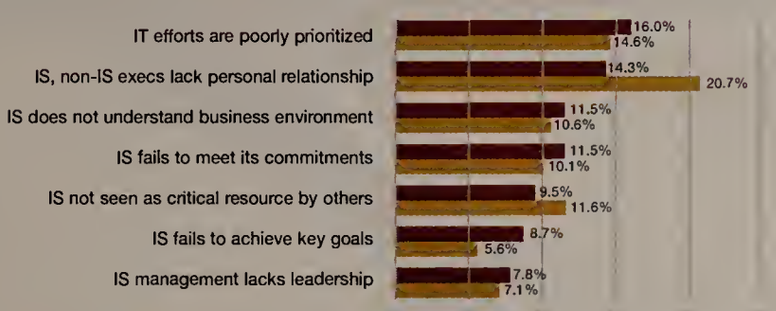
Non-IS executives, who complain that IS is off on tangential activities, put poor prioritization first. The solution to both problems is getting the business side to participate in IS decisions and projects. Non-IS executives need to lead in the justification and prioritization process, but they must also learn how to better manage IT investments.

Although the enablers and inhibitors to alignment have not changed since we began our study in 1992, one well-known model shows why alignment is a shifting target. It is the Strategic Alignment Model developed by Boston University professors John C. Henderson and N. Venkatraman (see footnote on page 11).

Alignment's Leading Enablers...



...and Inhibitors



Non-IT IT

Source: Survey of over 500 companies conducted between 1992-1996 by Luftman, Brier and Papp. Figures represent percentage of respondents who included this factor as one of the top three alignment enablers or inhibitors.

Illustrations by Paul Zwolak

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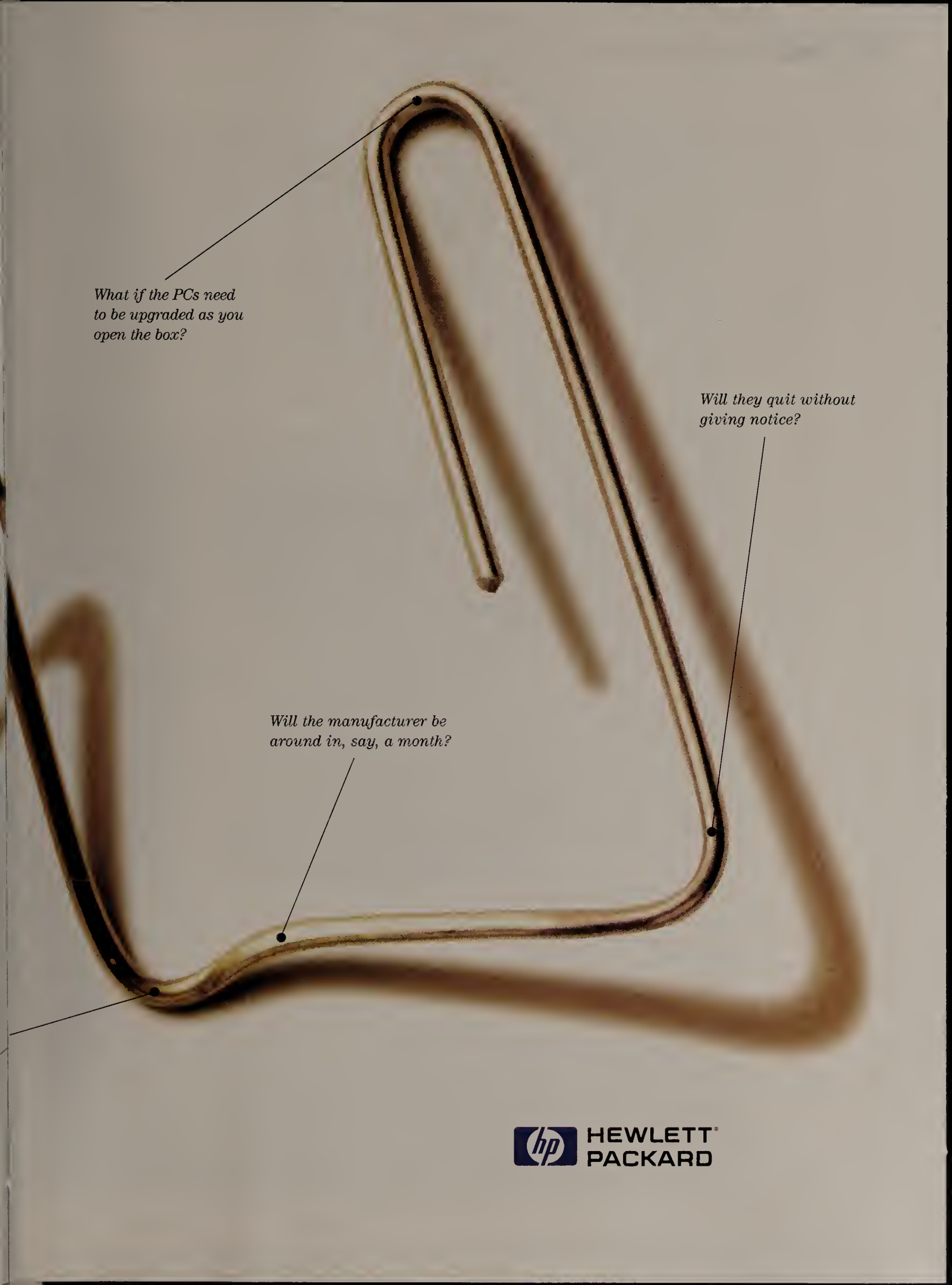

What if the PCs need to be upgraded as you open the box?
Will they quit without giving notice?
Will the manufacturer be around in, say, a month?
HEWLETT PACKARD

A Path Through the Sands

Alignment, the model shows, involves 12 factors that are usually in flux, yet need to somehow work in harmony to align IT with business strategy (see story page 7). The factors are each so complex that it is obvious that no one blend of factors will always result in alignment. Instead, IS executives must find a way to keep these factors in sync; a way to aim at these eternally shifting targets. It's important, too, that their approach maximizes enablers (like support from non-IS executives) while minimizing inhibitors.

How can IS executives start aligning IS and the business? By putting this strategic alignment model to work, they can use it to help examine the current state of IS and the business and to consider where both are heading in the future. Once you locate the gaps between the current state of affairs and future needs, a simple scenario planning exercise can help prioritize IT activities.

No good plan can work without salesmanship or the right people. The place to begin is by selling the need for an alignment analysis to senior non-IS management. Then find a sponsor: he should be the highest ranking executive in the organization being assessed. (If it's the entire company, the sponsor should be the CEO.) Next, select a cross-functional team to perform the analysis. The team should include six to 12 executives (including one or two from IS), recruited from various business units or departments. They should typically report to the sponsor or the executives that report to the sponsor; if the sponsor is the CEO, the team members should be senior vice presidents. Their knowledge of the business and credibility are critical for the success of the assessment.

Once the team is in place, the assessment can begin.

Start by analyzing each of the 12 components in the Strategic Alignment Model. First, focus on the current state for each of the 12 components. Then focus on the future state for each of the 12: where things are going to be. Ask each team member to discuss each current and future state from their respective points of view, be it marketing, finance, manufacturing, human resources or IS.

Alignment is about what management does to achieve its IT goals.

Keep the discussion free-flowing rather than restrictive; ask team members to suggest opportunities and problems, and place no time constraints when discussing the future. Brainstorming techniques and a professional facilitator who can ensure all team members present their views can be an enormous help. So can proper scheduling: Figure on a full day to do the alignment assessment (not including an explanation of the 12 components and assessment process, which should take place earlier).

Most executives find it helpful to discuss the results with their staff and then return a week later for another full day of brainstorming with the assessment team.

For example, a healthcare products distributor may identify a "systemic competency" in its IT strategy: The company's information systems contain knowledge about how much each hospital it sells to spends on supplies. After talking about it with her staff, a marketing executive on the team might identify a future competitive advantage: start selling to the hospitals' CFOs. If the distributor offers to turn supplies from a variable cost into a fixed cost by offering a single price for keeping the hospital supplied, the distrib-

utor can beat the competition. The data in the distributor's information systems can be turned to useful knowledge.

As a result of this analysis, the team will identify many such gaps between the present and the future state of each alignment factor. Now is the time to move on to the next stage of the analysis: prioritization. A simple 2 x 2 chart used in scenario planning — a technique for identifying the likelihood that events will occur and the implications for an organization — can help to prioritize the gaps the team has identified (see chart above).

Take each gap that has been identified and ask the team to place it on this matrix. The gaps that demand high priority are those which are likely to occur and likely to have an impact on the business: the upper right quadrant. Those items become high-priority projects. Those which fall in the lower left quadrant — low likelihood, low impact — should be regarded as low priorities.

The final step is to review the list of projects with the sponsor and other senior executives and

The Alignment Archipelago

The 12 factors involved in aligning technology and business

I. Business Strategy

1. Business Scope

The markets, products, groups of customers and locations where an enterprise competes. It also includes the buyers, suppliers, competitors and potential competitors that affect the competitive environment.

2. Distinctive Competencies

The core competencies that give a company a potential competitive edge: e.g., research, manufacturing and product development capabilities; cost structures and pricing strategies; sales and distribution channels.

3. Business Governance

How companies set the relationship between management, stockholders and the board of directors. It also includes how companies are affected by government regulations and their relations with strategic partners.

II. Organizational Infrastructure and Processes

4. Administrative Structure

How a company organizes its businesses, processes and people and sets out responsibility and authority.

5. Processes

How the company's business activities — the work done by employees — operate or flow. Improvement and value-adding activities are major issues here.

6. Skills

The competencies and values employees possess to carry out corporate strategies. Human resource management and outsourcing fall under this category.

III. IT Strategy

7. Technology Scope

The technologies and applications that are important for an organization to be successful.

8. Systemic Competencies

The critical capabilities that a company's technologies provide to the business, such as access to information, communication, etc.

9. IT Governance

How authority and responsibility for IT is shared between users, IS management and service providers. This includes how projects are selected and prioritized.

IV. IT Infrastructure and Processes

10. IT Architecture

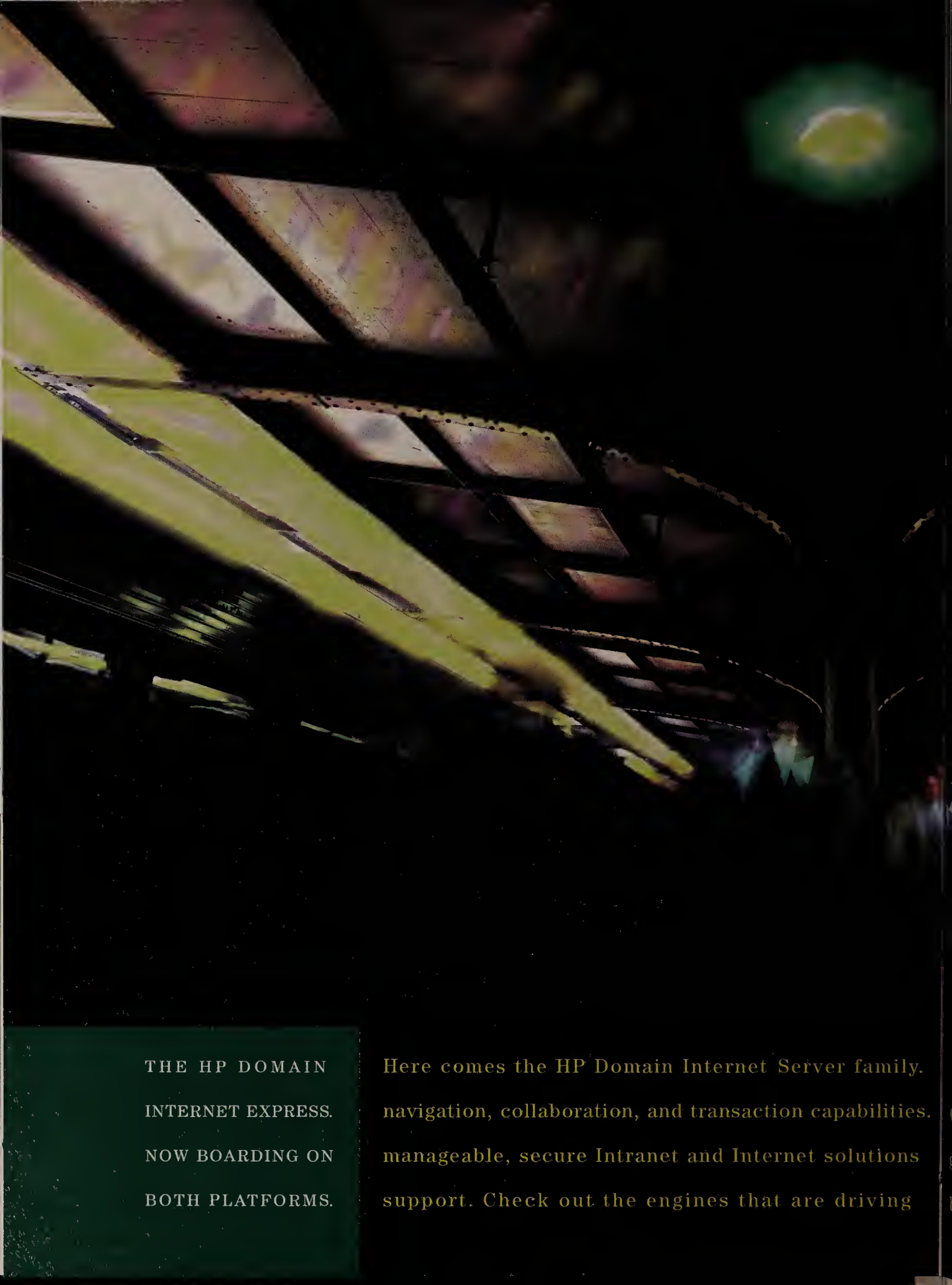
The technology choices, priorities and policies that enable applications, data, software, networks and hardware to be integrated into a cohesive platform.

11. Processes

The work and practices carried out to develop and maintain applications and manage the IT infrastructure.

12. Skills

The competencies and values of the individuals working to deliver the IT products and services. Includes training, motivation, hiring and firing of staff, as well as outsourcing.



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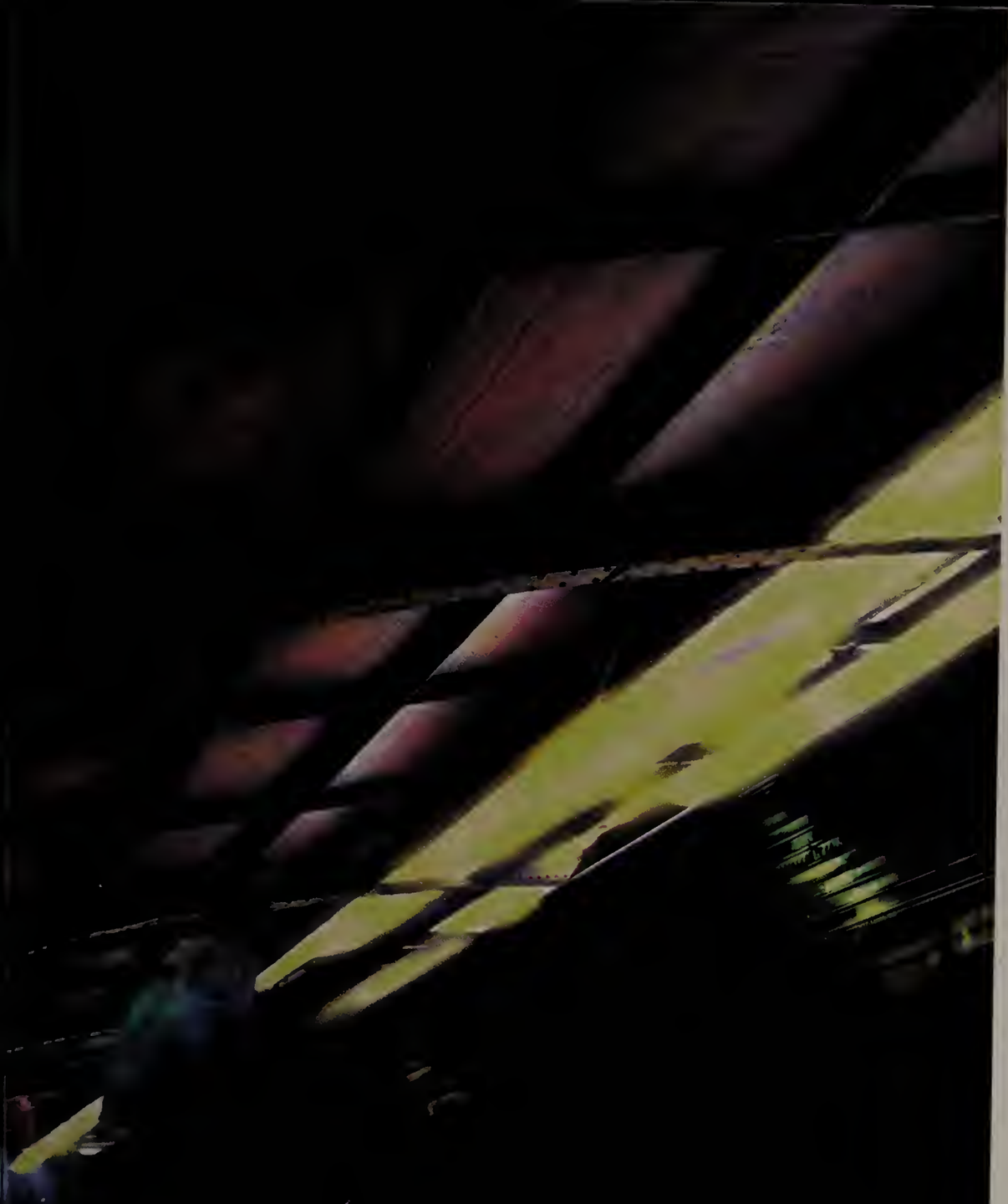

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get their approval. A line executive on the team, rather than an IS executive, should do the presentation.

I have helped introduce this technique to many companies. In almost all cases, I have found that the team wins approval for the high-priority projects they have identified. But this process has other positive side effects: The executive team walks away with a much better appreciation for IT. The presentation can be used to communicate with the rest of the organization. In fact, this method not only helps companies do a better job of aiming at the 12 moving targets involved in alignment, but also maximizes the enablers of alignment that our research has identified, while minimizing the inhibitors. This method is a way to win executive support, gain IS involvement in a strategy setting and effectively prioritize projects.

Preventive Medicine

A review board, "SPOCs" and the Strategic Alignment Model keep business and IT in sync at a Bristol-Myers Squibb unit

Alignment Assurances

Alignment is not left to chance at the Bristol-Myers Squibb Pharmaceutical Group, a $10 billion unit of the global healthcare product manufacturer, Bristol-Myers Squibb Co. "Strategic alignment heads the list of sources of competitiveness for the organization," says Vice President and Chief Information Officer Brian Crynes.

The Princeton, N.J.-based group, including the 700-strong information management organization led by Crynes, has instituted a new planning process, steering committees and a new position to ensure alignment.

The Pharmaceutical Group's IT Review Board, a steering committee of IS and non-IS executives, drives the planning process and ensures business leadership and accountability. The board uses the Strategic Alignment Model to identify IT opportunities and priorities. It also champions projects and decides which 20 IT projects to devote most of its time.

But the group doesn't only plan for alignment; it has created ways to track projects, share the lessons that the project teams have learned and make sure alignment takes place in the trenches and the executive suites.

A year ago, the group created a position — the SPOC, or Single Point of Contact — to make sure alignment takes place in the field as well as the executive suite. SPOCs, business-IT liaisons who report to IT but work in the group's geographical and functional units, are usually IT professionals with 15 to 20 years of experience. SPOCs represent IT within their units' operating committees. They also help establish measures to evaluate the progress of IT projects.

Review Board

The board also conducts post-project reviews. The reviews examine whether the projects ran on time, on budget and if they provide the expected benefits. They also identify effective project management and technical practices. The board's project reviews are posted on Bristol-Myers Squibb's intranet.

These alignment activities have led to many important IT initiatives supporting the group's sales and marketing, disease management, supply chain and finance organizations. The Pharmaceutical Group has already built a system that helps field salespeople and marketing pinpoint product markets. The system has been successfully deployed on time and on budget, Crynes says. Other projects include the group's enterprisewide SAP implementation and a global data warehouse project.

Initial Success

But while it's too early to judge the success of most of these projects, the group's alignment initiatives have already helped create a team of IS and non-IS executives and developed a way to prioritize projects. Senior business execs are acting as sponsors of IT projects. Alignment is now a process, not a wish, at the Pharmaceutical Group. Says Jack Pinter, director of global architectures, "We have taken the success we've had domestically with SPOCs and steering committees and are applying them globally."

There is no silver bullet appropriate for aligning all situations and goals. Businesses and technologies are changing too rapidly. There are too many factors involved in the alignment process. Relationships are as unique as the individuals who have them.

Still, by adopting an alignment assessment process such as this, IS executives can maximize the enablers of alignment while minimizing the inhibitors. They can build relationships, gain executive support, participate in strategy development and do a better job of prioritizing their projects. CIOs can keep their organizations in sync with the business, no matter how much the sands shift.

Just remember to be patient. This approach is systematic, but it takes time to win and maintain support. And the planning process itself will need to evolve over time.

But if anyone doubts the importance of IT alignment, tell them this: If alignment is important enough to be discussed in the White House, it's important enough to be discussed by your company's president and vice presidents. ◆

Footnote

In addition to Luftman's new book (refer to the "About the Author" box below), Henderson and Venkatraman have described their model in articles appearing in the *IBM Systems Journal, Business Quarterly* and in *Information Technology and the Corporation of the 1990s*, edited by Thomas J. Allen and Michael Scott Morton (Oxford University Press, N.Y., 1993).

Suggested Reading

Besides the author's book, *Competing in the Information Age: Strategic Alignment in Practice*, which includes a paper by John C. Henderson and N. Venkatraman describing the Strategic Alignment Model, here are other works on the topic of alignment:

Strassmann, Paul. *The Business Value of Computers.* (Information Economics Press, New Canaan, Conn., 1990).

Parker, Marilyn & Benson, Robert. *Information Economics.* (Prentice Hall, Englewood Cliffs, N. J., 1988).

Rockart, Jack. *The Rise of Managerial Computing.* (MIT Press, Cambridge, Mass., 1986).

For more information on scenario planning, see *The Art of the Long View* by Peter Schwartz (Doubleday, N.Y., 1991).

Computerworld has published many articles on the subject of alignment. They include:

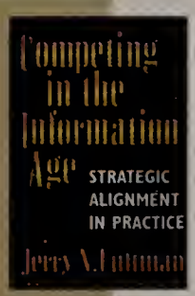
Alice Laplante's 1994 series on the value of IT: "No Doubt About IT" (Aug. 15), "IT's Got What it Takes," (Oct. 3), "IT All Adds Up" (Oct. 31).

Paul Strassmann's Feb. 27, 1995 Leadership series article, "Governance: The New IS Agenda," which can be downloaded from http://www.computerworld.com/Leadership.

Allan E. Alter's "The Profit Center Paradox," April 24, 1995 and "A More Perfect Union," Nov. 28, 1994.

About the Author:

Jerry N. Luftman is both the editor and a contributor to *Competing in the Information Age*, a collection of articles and studies on IT alignment recently published by Oxford University Press (New York & Oxford, $35, 414 pages). The former IBM IS executive is now a professor and the executive director of the Stevens Institute of Technology's Information Management Research Center. His career includes 22 years at IBM and positions in IS management, consulting and marketing. Luftman can be reached at jluftman@stevens-tech.edu.



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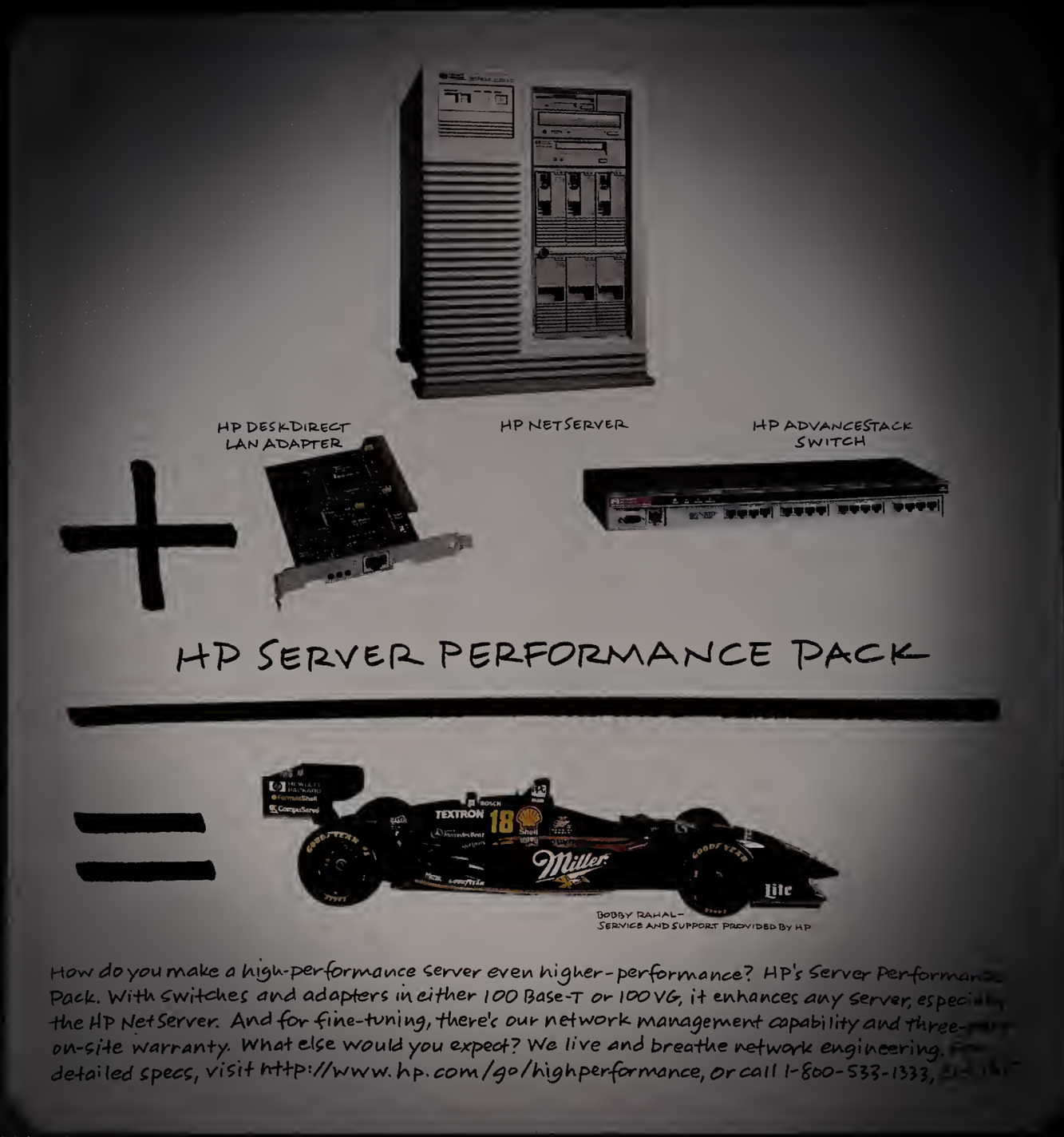
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HEWLETT PACKARD

Interview with a mainframe

Bruce Hoard

Editor Paul Gillin put down his issue of *Linotype-Week* and took a big pull off his stogie as I entered his office. "Hoard," he barked, "it's time you earned your keep. I want you to go interview a mainframe. I'm talking IBM 370/158, 1.5 MIPS, circa 1972. Do it now!"

I've conducted some strange interviews in my time — streaming tape drives, access concentrators, even a data warehouse — but this was something else. We all know how reclusive and eccentric the big iron set is, especially those old 370s. This wouldn't be a quick chat with some motor-mouth modem or trivial talk with some bursty little Bernoulli box.

I'd seen enough 370s to know the type: arrogant, unapproachable and full of disdain. They regarded their plug-compatible competitors from Amdahl, Control Data, Xerox and the rest as so many craven copycats.

Humbled by time, a former giant sings the big-box blues.

And the 158s were the worst of all. When they debuted, Big Blue was at the height of its monopolistic glory, and mainframes were the shining beacons of its success. The 158s were top-of-the-line — the biggest, baddest boxes of them all.

RAVAGES OF TIME

Now, more than 20 years later, the 158s and their days of arrogant glory are nothing but memories. Reportedly, the few survivors are embittered and broken down. Sure, they still hold annual reunions in Armonk, but fewer and fewer show up with each passing year.

It took some serious sleuthing, but in a few days I had my mainframe, such as it was. This particular piece of heavy metal had spent the past 10 years in a Ronco warehouse in Sioux Falls, S.D., keeping tabs on the sales of Kitchen Magicians, Salad Shooters and a host of other made-for-TV products.

When I entered the ramshackle warehouse, the mainframe knew right away that I was there. In an Oz-like voice that seemed to be amplified from every corner of the building, he boomed, "Yo, turkey, whatcha doin' here?"

Yo, turkey?

"I'm looking for a Mr. I. B. Machine."

"What? Speak up. Who's asking?"

"My name's Hoard. I was sent by Paul Gillin."

"Can't hear you kid, louder."

"Gillin!"

"Oh, Gillin," he re-boomed, "I thought that geek went out with flat files. So, what do you want? Can't you see I'm busy?" And with that, he belched out a 150-page report.

"You should try COLD," I offered. "Computer output to laser disc. Then you could give your printer a rest."

"Of course it's cold in here," I. B. replied haughtily. "When you don't have air conditioning, you have to keep the windows open."

Hmm, things weren't going well. I tried again. "I was just wondering how you view modern mainframes? Especially the CMOS machines."

"Do I see any moss? What kind of a dumb question is that? What do you think this is, somebody's yard?"

I tried yet another tack. "I was just wondering about the master/slave relationship you have with all these other machines!" I hollered. "Isn't that a little kinky?"

"Kid, around here, we do things my way. And I don't cotton to any of that fancy SNA stuff either. I'm strictly bisynch. Get the picture?"

I did, and it wasn't pretty. It was time to leave. Gillin had his interview with a mainframe, and I had a deadline to meet. And old I. B.? What did he have, now that he was about as valuable as a PDP-11? The big old back-end machine could only recall batch runs of the past while the winds of time whistled by so cruelly.

Hoard hopes to get a job at the National Enquirer*'s new Washington bureau. In the meantime, he can be reached at bruceh6687@aol.com.*

A city of felons at T1 speeds

John Gantz

In my last column, I talked about commerce on the Web. This time, let's talk about the natural follow-up — crooks on the Web. Thousands of them.

As the Internet touches more and more of the general population, more and more of the general population also will touch the Internet.

Selected data from the federal Uniform Crime Reports shows that for every 100,000 citizens in 1993, 306 were crooks working in the fields of fraud, forgery, vandalism, embezzlement and receiving stolen goods. With 50 million people expected to be using the Web by the end of this year, that means 150,000 of them will be crooks.

BAD GUYS

Yeah, yeah, yeah, the Web is a more refined place than the streets of New York, and you can't extrapolate standard crime figures to the online world.

Still, there will be a lot of bad guys out there. And without the restraints of time and distance, the Internet could put us in contact with a whole city's worth of felons at up to T1 speeds.

Although there isn't good data on computer crimes, most sources portray the losses at billions of dollars per year. Yet outside a small community of specialists, computer security is the most boring topic known to man.

IS professionals know better. In a recent survey of 100 U.S. businesses, International Data Corp. found that 15% already encrypt external electronic mail, and 45% expect to encrypt it within 12 months. About 7% already use digital certificates and signatures, and 22% expect to do so within 12 months.

I never expected the percentages to be that high (even if the expectations are inflated).

Even so, it appears that most companies don't protect their confidential E-mail. Yet anywhere from 15% to 25% of all E-mail messages contain confidential information.

So I see a situation in which IS professionals see and understand the security dangers the Internet brings — adding to the existing ones by an order of magnitude — but are unable to articulate them. Or, rather, their message falls on deaf ears.

There are a couple of things you should be doing. On the small scale, you should investigate the blossoming product categories for Internet security tools, from those packages that tell you which URLs your employees call up to the ones that keep tainted Java applets from zinging around inside your PC. The budget spreadsheet for any Internet or intranet application should include a row for firewalls as well as other security tools.

If IS doesn't guard the corporate network, no one will.

On the larger scale, you should educate your business managers on the need to invest time, inconvenience and money in security solutions — without putting them to sleep or scaring them to the point where they quash all Internet and intranet applications.

CREATIVE SALES JOB

My advice is to tell this story with case studies, anecdotes and live examples, not with statistical graphs and calculations. Numbers are great for selling the idea of cutting costs or increasing revenue, but getting executives to jump up and down about risk avoidance and loss prevention requires a more creative approach.

And keep this in mind: If you don't watch the store, probably no one will. Keeping crooks off your network may do more for your company than rolling out Office 97 for the finance department, installing Pentium Pro PCs in the marketing department or purging two-digit dates from your shop floor software.

Gantz is a senior vice president at International Data Corp. in Framingham, Mass. His Internet address is jgantz@idcresearch.com.

COMMENTARY

Dangerous expectations

DAVID MOSCHELLA

IN HIS STATE OF THE UNION address, President Clinton declared: "We've only begun to spread the benefits of a technology revolution that should become the modern birthright of every citizen." Later in the speech, he added: "As the Internet becomes our new town square, a computer in every home . . . will no longer be a dream but a necessity. And over the next decade, that must be our goal."

And a worthy goal it is. But one has to wonder what our industry has done to deserve such special attention, however gratifying. In his speech, the president used the word "Internet" six times and put more emphasis on information technology than on Social Security, health care, poverty, the environment, Europe, Asia and Russia. He didn't even mention Japan.

Does that make sense?

Consider the underlying logic. America has a serious grade-school education problem; tests consistently show that we trail most of the developed world. Like many people, the president sees the Internet as a key part of the solution. Never mind that the U.S. already has more computers than any of the countries we're worried about. Internet promoters also ignore the fact that just about every new medium, including TV, cable TV and the VCR, has been hailed as an educational wonder, only to eventually be seen as part of the problem.

We could bask in the hype if the president's rhetoric wasn't so potentially damaging to our industry. By stating that "every 12-year-old must be able to log on to the Internet," President Clinton has endorsed the view that children without 'net access are at a significant societal disadvantage. This idea is dangerous, partly because new technologies always take time to become pervasive, but mostly because it just isn't true. Can you name one important social, cultural, educational, business or government service that is exclusively, or even primarily, available online?

A BIT OF HUMILITY

Although many Americans can't afford computers, even more have decided to spend their media money elsewhere — on cellular telephones, TVs, VCRs, cable TV, stereos, CD players, radios, books, newspapers and magazines. In other words, many consumers don't think computers are worth the cost, let alone that they're essential.

This country has enough real concerns about societal gaps without creating imaginary ones. The widespread belief that computers are essential to education could easily transform the Internet into every demagogue's favorite new symbol of an increasingly divided society, especially given the great wealth of our industry.

What's needed is a bit of humility.

Yes, universal Internet service is a worthy long-term goal. Presidential leadership can help mobilize resources, and our industry could do more for society.

But as much as we might want to promote and sell technology, let's not kid ourselves. Computers don't make students more ambitious or teachers more committed. Technology alone won't make us better citizens, and a 12-year-old's lack of Internet access isn't a sign of parental neglect or societal failure. Computers aren't that important — at least not yet.

Moschella is senior vice president of research at Computerworld, Inc. His Internet address is david_moschella@cw.com.

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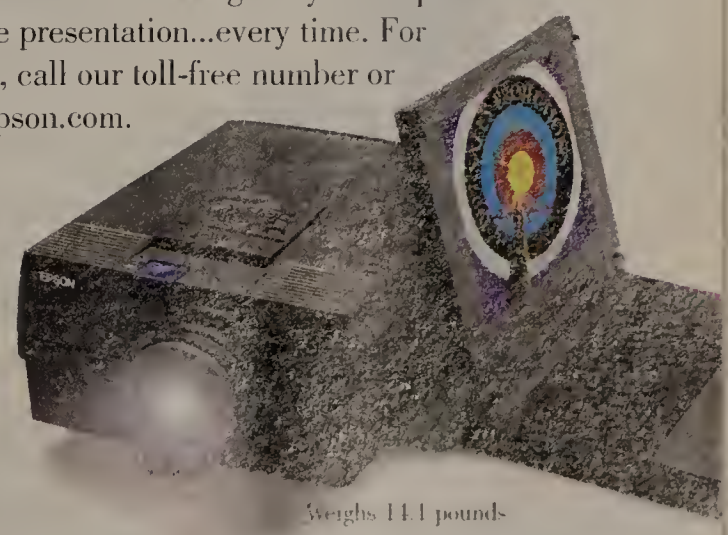

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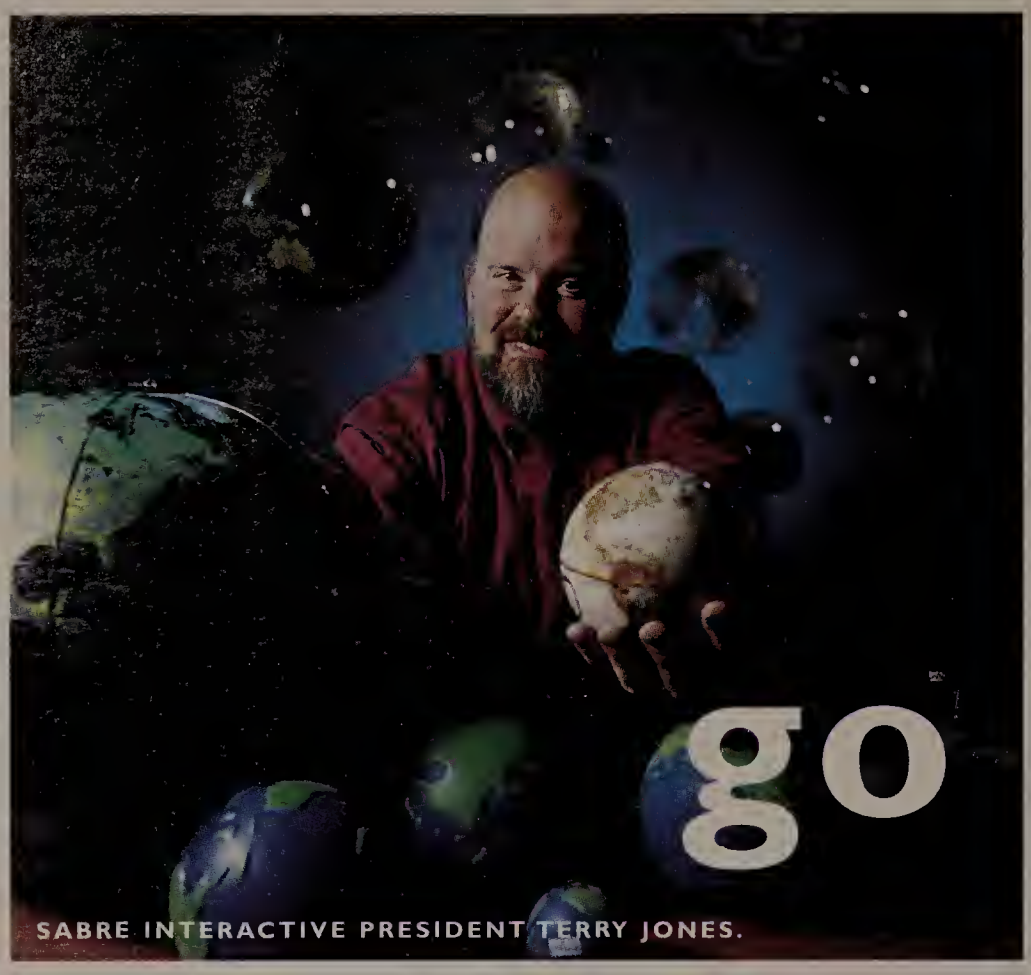

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Servers & PCs

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Briefs

Taking bite from Apple

There are indicators that Macintosh clone makers are taking a respectable 10% out of Apple Computer, Inc.'s sales. Pieter Hartsook, vice president of marketing and analysis at Apple, estimated that Macintosh clone vendors shipped about 100,000 to 120,000 units in the fourth quarter last year. Apple shipped 923,000 units in that period.

Sales of Power Computing Corp.'s Macintosh compatibles were said to account for the bulk of clone sales. Power Computing officials in Round Rock, Texas, declined to comment.

Low-end Amdahl

Amdahl Corp. is shipping the LSV 4100, an entry-level disk array for clustered Windows NT servers. The array has a capacity of 91G bytes and can be upgraded to Amdahl's high-end LVS 4500 array. The announcement from Sunnyvale, Calif.-based Amdahl follows the firm's release last year of its own line of Windows NT servers.

Multiple access

ICL, Inc., the U.S. software arm of U.K. mainframe maker ICL PLC, last week announced PC-to-mainframe access software. Dialogue Manager lets Java-based PC clients access data stored on multiple mainframes from one Windows-based screen. ICL in Reston, Va., is selling Dialogue Manager for $5,995 per server, with runtime licenses starting at $69.

Top 5 U.S. notebook vendors for Q4 1996*

	MARKET SHARE
Toshiba	21.9%
IBM	14%
Compaq	9.7%
Texas Instruments	5.9%
Dell	4.8%

Total units shipped: 1.53M

*Preliminary numbers

urce: International Data Corp., Framingham, Mass.

ENTERPRISE PLATFORMS

IBM mainstays fend off NT

By Tim Ouellette

IBM'S MAINFRAME and midrange operating systems hold a slowly diminishing lead over Unix and Windows NT in high-end computing, analysts said.

But analysts also consider Windows NT — not Unix — as the main threat to these IBM platforms, even though research shows that Unix holds a solid enterprise computing lead over Windows NT [CW, Feb. 10].

Analysts said this is because the mainframe OS/390 natively supports Unix application programming interfaces and, therefore, Unix applications.

At the same time, the AS/400 midrange system already supports 64-bit computing, something many variations of Unix are still trying to perfect. OS/400 won't support Windows NT natively, but the AS/400 carries an Intel Corp.-based PC board that soon will be able to run Windows NT applications in the AS/400 box.

Gartner Group, Inc. in Stamford, Conn., said IBM will continue to invest in research and

IBM, page 41

ONE WORLD, ONE OS?

As S/390 and AS/400 users look to the future of their platforms, they should consider the following:

- If they choose one operating system, they may be controlled by one vendor
- AS/400 vendors will be porting their turnkey applications to Windows NT
- IBM will become a one-stop shop for Unix, AIX, OS/390 and Windows NT
- The AS/400 won't support Windows NT natively because PowerPC-based systems won't support Windows NT

Source: Forrester Research, Inc., Cambridge, Mass.

Narrowing the desktop backup gap

▶ *Tools streamline data protection*

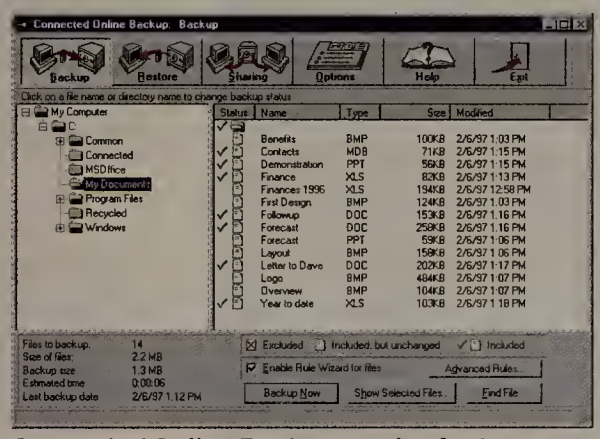
By Matt Hamblen

FACE IT: Few PC users bother to back up data, even though analysts estimate that half of all corporate records could be stored at the desktop.

Analysts said no more than 10% of desktop PCs are protected by a corporate strategy for backup. And half of a company's data is being stored on PCs instead of elsewhere in a company's system, they said.

PROTECTION

This predicament has some information systems managers worried about how to best protect vulnerable company information that could be lost when a notebook computer is stolen or a PC's hard drive fails.



Connected Online Backup service features an onscreen report of stored files and their status

At least two storage vendors — Connected Corp. in Framingham, Mass., and Seagate Software in Lake Mary, Fla. — have recently come up with ways to help IS departments deal with this desktop storage problem. Seagate is selling one-touch software to back up data; Connected is selling an online service that automatically performs desktop and mobile backups each day.

"People at the desktop don't have time, or they forget to back up," said Dirk Cotton, director and manager of Internet service at Cable & Wireless, Inc., a telecommunications company in Vienna, Va.

Cotton has beta-tested Connected's Connected Online Backup by backing up hard drives on about 30 PCs.

Backups, page 41

Quicker modems get mixed reviews

By Mindy Blodgett

INTERNET SERVICE providers report mixed results in early trials of new 56K bit/sec. modems.

The chip modems are supposed to let users download from the Internet at 56K bit/sec., which is about twice the speed of today's modems. But industry observers doubt the modems can deliver that performance under real-world conditions.

For instance, Robert Sanders, chief technology officer at MindSpring Enterprises, Inc. in Atlanta, last week said his company is getting an average speed of only 40K bit/sec. in tests of

Modems, page 38

Notebook users will win in squabble over disk storage

By Matt Hamblen

A NOTEBOOK STORAGE FIGHT is shaping up between makers of 2.5-in. disk drives and those who make the newer 3-in. disk drives.

For notebook users of all types, the tussle promises to provide them expanded storage capacity at no additional cost.

"You can never have too much storage space, given that notebooks are basically mobile PCs," said Stanley Dobrowski, data center manager at the Bergen County Utilities Authority in Little Ferry, N.J. "If competition drives storage capabilities up, that's good."

The storage industry developed 2.5-in. drives in 1988.

Today, production is dominated by IBM's Storage Systems Division in San Jose, Calif., and Toshiba America Information Systems, Inc. in Irvine, Calif., analysts said.

Last year, Western Digital

Storage, page 38

RISING CAPACITY

The evolution of 2.5-in. disk drives

1988	Prairietek	20M bytes
1995	IBM	1.2G bytes
1996	Toshiba	3.3G bytes

Modems get mixed reviews

CONTINUED FROM PAGE 37

modems from U.S. Robotics Corp. in Skokie, Ill.

"We're working with early code; U.S. Robotics just sent us some new code which we hear works much better," Sanders said. "But so far, because of extra analog conversions and general poor line quality out there, expecting to get 56K may not be reasonable."

"I'm optimistic about the technology," he said, "but we have to be careful not to raise customer expectations by too much. We had a lot of people calling when they first came out with 28.8 [K bit/sec.], and they were complaining they were only getting 24 [K bit/sec.] ... this would be much worse."

Users were excited when it was announced in September that several companies — including U.S. Robotics, Rockwell Semiconductor Systems and Lucent Technologies, Inc. — were working on the 56K bit/sec. technology.

QUALITY TIME

The modems, which will cost about $200, should lead to more Internet use, faster connection times for users and shorter online sessions. U.S. Robotics had planned to ship new products later this month but said it will move up the shipping dates.

But analysts and industry observers have questioned whether users can expect the 56K bit/sec. speeds because few users have the perfectly clean telephone lines needed for the modems to work best. The main problem is that analog phone lines have been designed to suppress noise at the expense of speed. And connections at higher speeds are often dropped because the lines can't handle the traffic.

But Brian Bird, president of Tidal Wave Communications, Inc. in Chantilly, Va., said he sees connection times of 53K and 54K bit/sec. in his testing.

"I think customers are really going to like it because it will cut down on per-minute charges," Bird said.

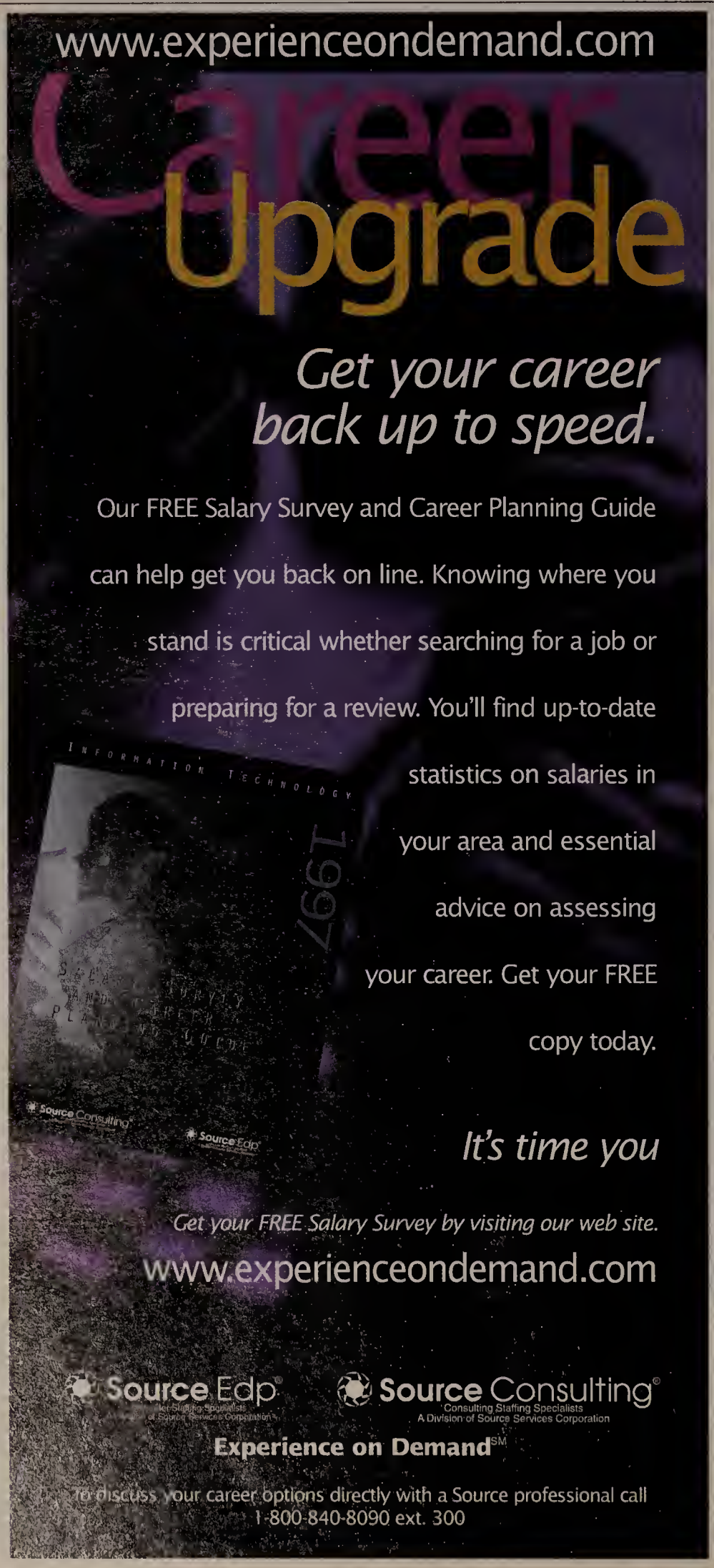
In the meantime, the battle for standards among the rival modem makers continues to heat up. Rockwell and Lucent are working on one standard, U.S. Robotics is working on another.

"I hope they set standards soon because it doesn't help anyone if there aren't any," Sanders said.

ONE-WAY STREET

How 56K bit/sec. technology works:

1. A user sends a request for a Web page to an Internet service provider over analog lines at speeds between 28.8K and 33.6K bit/sec.
2. The information is converted to a digital signal, then converted back to analog.
3. When the user downloads the information, it is sent back at speeds between 50K and 56K bit/sec.



Squabble develops over storage

CONTINUED FROM PAGE 37

Corp. in Irvine, Calif., and two smaller companies — Integral Peripherals, Inc. in Boulder, Colo., and JTS Corp. in San Jose, Calif. — separately introduced 3-in. disk drives for the notebook computer. The largest 3-in. disk drive has a 2G-byte capacity.

"The consensus is that this 3-in. drive is a serious competitor, especially with a high-credibility company like Western Digital coming up with one," said James Porter, president of Disk/Trend, Inc., a consultancy in Mountain View, Calif. "It's clear that the 3-in. [disk drive] will have a role in the future of the notebook, but [it's] not clear what share they will take," he said.

MOBILE COMPUTING

The trend appears to have IBM worried. Porter said IBM last year shipped 5 million 2.5-in. drives — Toshiba shipped 3 million — and has everything to lose from a new technology threat. IBM officials said they are preparing a white paper that describes the advantages of the 2.5-in. drive over the 3-in.

"That sounds a little paranoid to me," Porter said of the white paper, noting IBM's undisputed leadership during the past three years in expanding storage capacity with the highest aerial density. Aerial density is the number of bits per square inch on a hard disk.

IBM and Toshiba last year tried to outdo each other with successive announcements declaring more capacity or thinner and lighter 2.5-in. drives.

Thanks to competition and innovation, 2.5-in. drives now have up to more than 3G bytes of storage space while others are as thin as 9 mm and weigh only 99 grams.

More storage means notebook users can store more electronic mail, personal productivity software and bulky Internet files with audio and video.

"Our road warriors out there require as much hard drive capacity as they have at the office because they want a full complement of good programs," said John Winkel, a member of the information systems team at Ranpac Corp. in Concord, Ohio. "Nobody wants to download to a diskette anymore. A larger disk capacity is second most important to overall functioning of the notebook," he said.

The chief advantage of a 3-in. drive is fewer parts, but IBM officials said the company can hold on to market advantage by emphasizing the larger capacity of their 2.5-in. drives.

Dobrowski said end users don't care as much about the size of a drive in a mobile computer as its total capacity, which may bolster IBM's case.

ISO 9000 certification has become critical for companies that want to retain and attract customers. But the endless process of procedures can have you running

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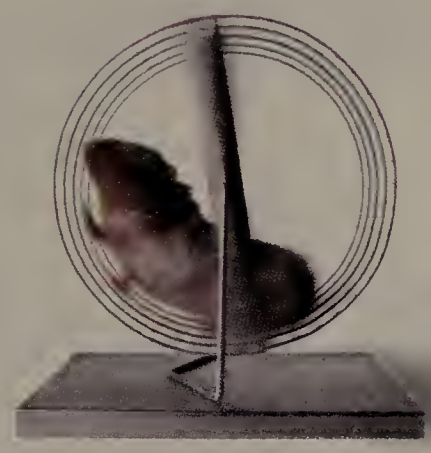

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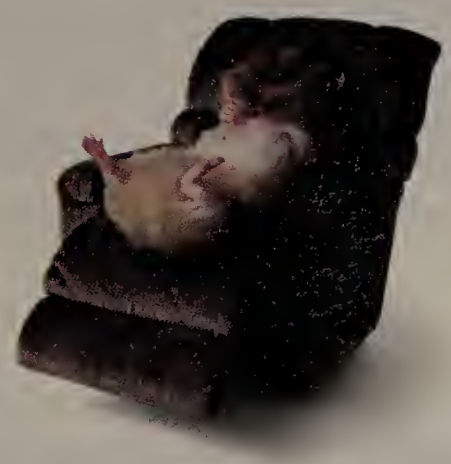

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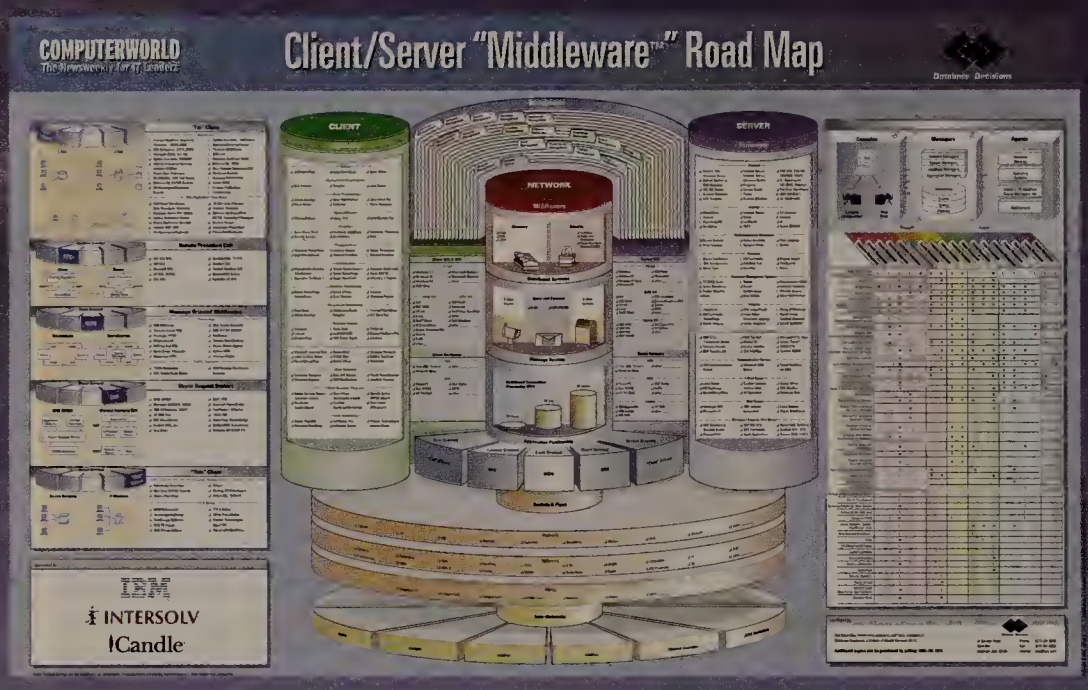

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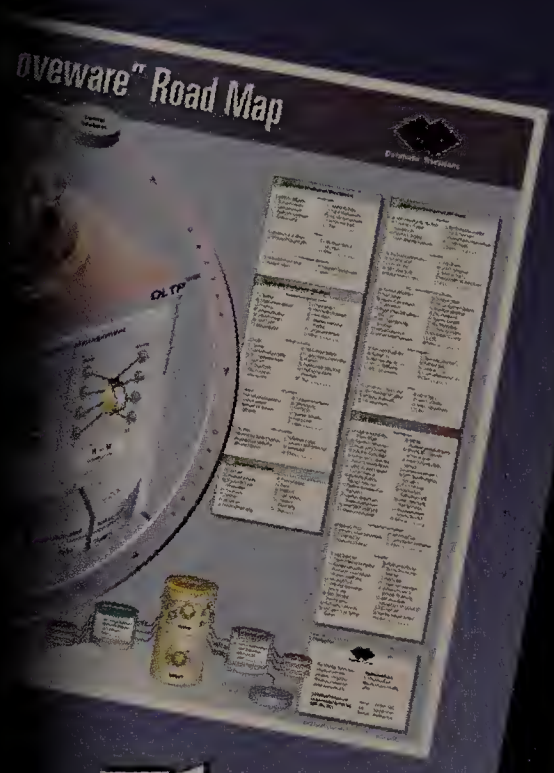

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IBM platforms still on top

CONTINUED FROM PAGE 37

development on the OS/390 through 2001, but the research firm also said IBM will slowly shift its focus to support existing S/390 customers.

And as Unix and Windows NT servers ramp up their performance to mainframe levels, Gartner expects IBM to shift to Windows NT as its most strategic, general-purpose enterprise platform by 2001. For example, OS/390 will support Windows NT application interfaces this spring.

FRIENDS IN HIGH PLACES

The OS/390 has received strong support lately from software giants that port their applications to the platform, and IBM has launched the OS/390 Partners in Development program to maintain user interest in OS/390 [CW, Jan. 20].

IBM's release of a version of OS/390 on the RS/6000 Unix platform also has given third-party developers a low-cost way to test and convert their applications. That version has been dubbed the R/390.

"Before [the R/390], testing [on the S/390] would have been a bet-your-company investment" because companies had to buy a high-end mainframe for application development, said Tom Laffey, vice president of engineering at Talarian Corp. in Mountain View, Calif.

The firm is releasing an S/390 version of its middleware, which previously ran only on Unix.

With the S/390's low-end offerings and packages, users have more flexibility than ever to get OS/390 reliability and power in whatever price range they want, said Mike Kahn, chairman of The Clipper Group, Inc., a consultancy in Wellesley, Mass.

Ed Carr, an analyst at Aberdeen Group, Inc. in Boston, said the OS/390 will bring its mainframe capabilities downstream enough to battle Windows NT on its own turf.

Backups

CONTINUED FROM PAGE 37

"It's automatic," Cotton said. "You can't forget, and you can't get too tired to use it. Each day, the service's software sees what files you've saved and backs them up, including [electronic-mail] messages, unless you tell it not to."

With this service, a user's files are stored online in two Connected data centers in Framingham, but only after the service's software compresses and encrypts the files to protect against piracy. Cotton said the process alleviates his concerns about data security.

FILLING THE GAP

Analyst Mike Peterson, president of Strategic Research Corp. in Santa Barbara, Calif., said Connected and several other smaller companies that offer dial-up backup services represent an important market niche.

"If you have a mobile PC, you're extremely exposed to failure and having to rebuild" the contents of a hard drive, Peterson said.

Seagate recently announced Seagate Backup Exec 2.0 for Windows 95, which features one-button backup/restore to automatically rebuild an operating system and restore the latest full backup from secondary storage in the event of disk failure.

Seagate's product allows storage to various devices, including tape and optical devices and popular products such as Jaz and Zip drives from Iomega Corp. in Roy, Utah.

Jeff V. Pulver, who is beta-testing Seagate Backup Exec, said Seagate's one-click backup is "like one-stop shopping."

"I'm a bit of a nut when it comes to backup," said Pulver, owner of Intercomp Design, Inc. in Neshanic Station, N.J. "I lost my whole C drive once. I have 200 programs on my machine, and if I ever lost my hard drive, I'd have to scramble."

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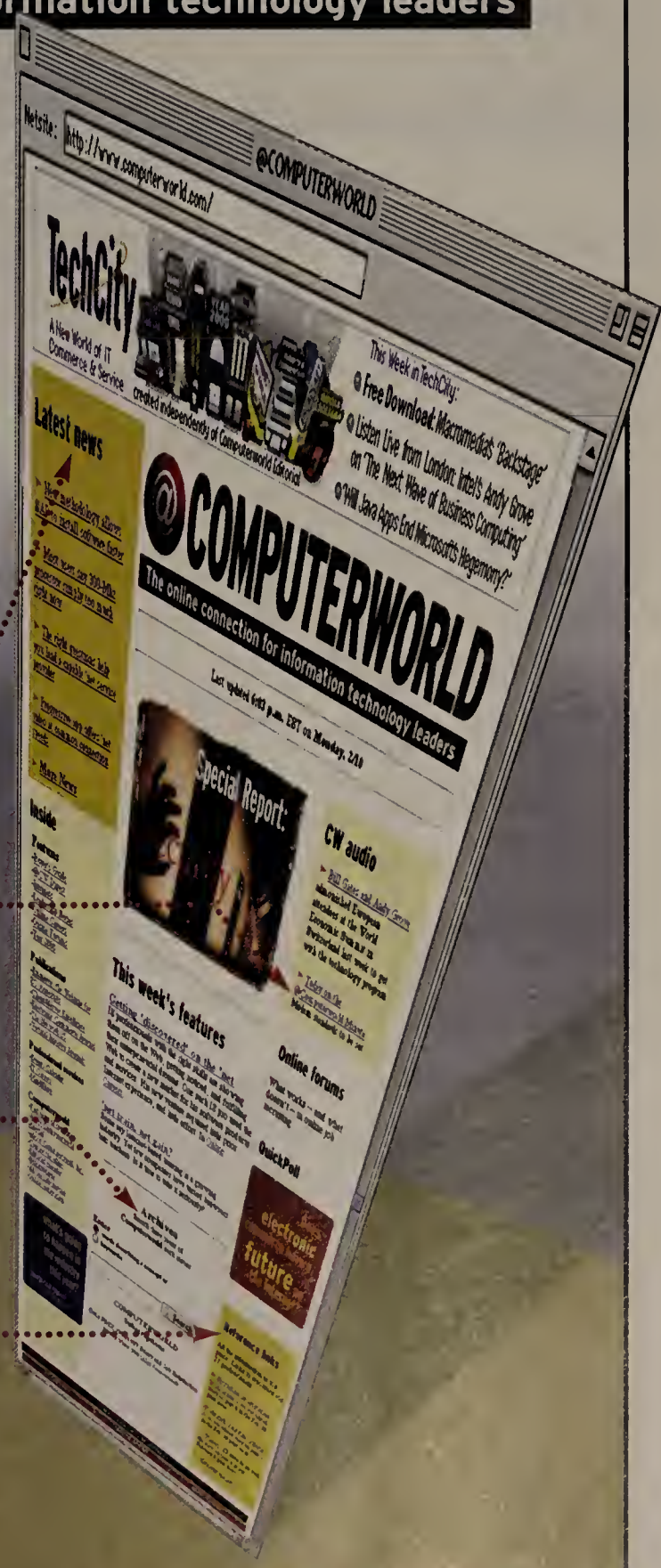

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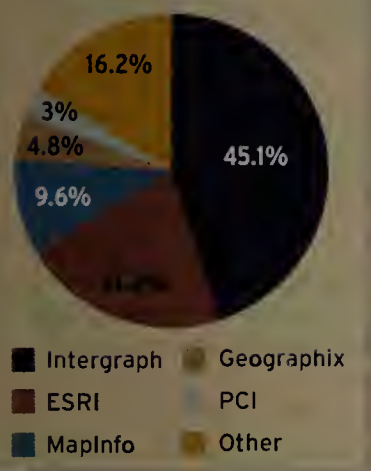
Software

Client/Server • Development • Operating Systems

Briefs

1996 worldwide PC-based geographic information systems software revenue: $313 million



Source: Daratech, Inc., Cambridge, Mass.

Claris makes buys

Claris Corp. in Santa Clara, Calif., last week expanded its electronic software distribution plans to include Software.net and Buydirect.com, two popular World Wide Web sites that handle electronic distribution. In addition to being able to download beta versions, trial software and maintenance updates directly from Claris' Web site, users will be able to directly purchase any of Claris' Windows or Macintosh offerings via Software.net and Buydirect.com.

IBM to extract data

IBM last week announced plans to resell data extraction tools developed by Evolutionary Technologies, Inc. in Austin, Texas. The ETI-Extract tools will also be integrated with IBM's DataPropagator software for moving files among databases. That will enable IBM to add support for mainframe databases such as Computer Associates International, Inc.'s CA-IDMS and Software AG's Adabas.

Tool hides Java

Magna Software Corp. in New York has announced software that lets users develop Java client applications to access mainframe CICS transaction services. Magna X supplies Java classes and methods to bridge differences in datatype and language between Java and Cobol. Pricing starts at $50,000.

MANAGEMENT TOOLS

Warehouse monitors in demand

By Craig Stedman

AS MORE DATA warehouses move out of development and into production, information systems managers are trying to figure out how to manage and monitor the beasts. But the available packaged tools remain in an embryonic state.

The cabinet isn't completely bare. Vendors such as Hewlett-Packard Co. in Palo Alto, Calif., and Information Builders, Inc. in New York provide some tools for tracking data warehouse usage as part of their warehousing bundles, analysts said. And a pair of start-ups recently introduced suites of management and monitoring tools that will be tied together later this year.

But for now, IS managers said they mostly are being left to

Warehouse, page 45

TOOLS FOR MANAGING DATA WAREHOUSES

Intellidex Systems

Intellidex Warehouse Control Center

- Central point for administering warehouse metadata
- Synchronizes metadata from multiple-source databases
- Enables end users to navigate through a warehouse

Pricing starts at $40,000

Pine Cone Systems

Data Usage Tracker
- Captures statistics on warehouse usage

Data Content Tracker
- Measures and analyzes growth of data

Refreshment Tracker
- Monitors warehouse loading process

Charge Back Manager
- Quantifies usage by department

Price is $7,500 to $60,000 per product

New power comes at a cost

▸ Visual Basic Version 5 gets harder to use

By Sharon Gaudin

THE LATEST version of Microsoft Corp.'s Visual Basic development tool has gained power and sophistication, but it may have lost the ease of use that made it one of the most popular tools on the market.

Microsoft announced Visual Basic Version 5 Feb. 3, and users said the active document and server features, along with significant speed enhancements, have dramatically upped its performance.

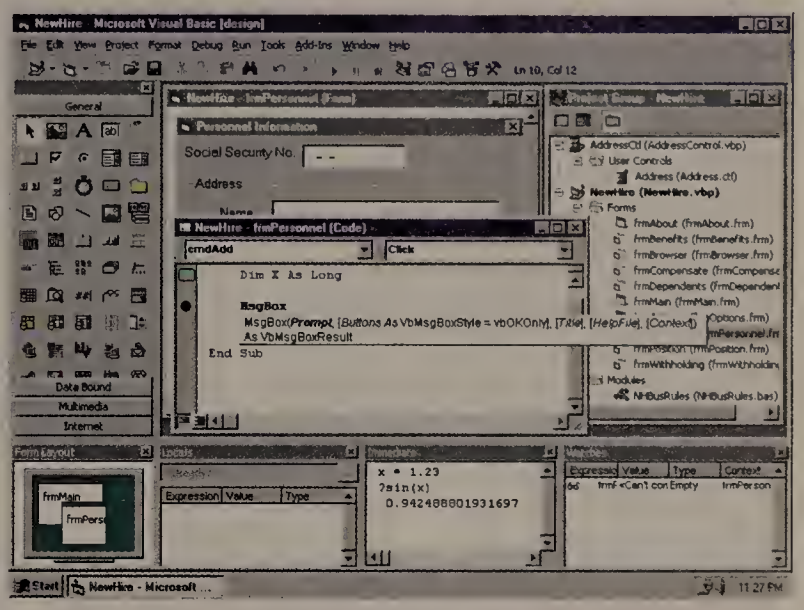
Now it is almost as strong as Microsoft's Visual C++, a tool known for being a powerhouse — and for being difficult to use.

"This version will draw more hard-core programmers into the [Visual Basic] camp because it will be a hard-core computing language," said Dan Mezick, a Visual Basic trainer at New Technology Solutions in North Haven, Conn. "[Version 5] is going to attract people who previously only were interested in C++.

"There's going to be a trade-off," Mezick said. "It's more powerful, so the learning curve is going to be steeper. The people who haven't learned [Visual Basic] are going to have a steep climb. The people who stayed with [Version 3] are going to need training."

Evan Quinn, an analyst at International Data Corp. in Fra-

Visual Basic, page 45



Microsoft's Visual Basic Version 5 includes a native code compiler, high-speed data access and an improved environment

SYSTEM ENHANCEMENTS

Norton Utilities for NT fixes fragmented files

By April Jacobs

IT'S QUICK-FIX time for Microsoft Corp.'s Windows NT 4.0.

And Cupertino, Calif.-based Symantec Corp.'s Norton Utilities for Windows NT 4.0 gives users a way to prevent hard-drive files from fragmenting, recover lost files and repair hard-disk problems.

Users said the "defragmentation" feature is among the most useful in the new utilities package because it prevents files from going piecemeal to different segments of a hard drive. Keeping files together allows for quicker file retrieval and better system performance.

Besides the basics, Norton Utilities for NT 4.0 includes an Internet Speedometer that can show users what kind of turnaround time they have for Internet connections and accessing World Wide Web sites.

Another feature, LiveUpdate, lets users connect to Symantec's Web site (www.symantec.com) and download updates to applications.

FEATURES OF NORTON UTILITIES FOR WINDOWS NT 4.0

- Speed Disk
- Disk Doctor
- Unerase/NProtect
- System Doctor
- System Information
- LiveUpdate

John Williams, an information systems manager at Priority Pharmacy, Inc. in San Diego, said the new Norton functions will help his company's plans to implement Windows NT Server.

"We write a lot of temporary

Norton Utilities, page 46

Next Oracle7 release to feature fingerprint ID

By Rebecca Sykes

THE NEXT RELEASE of Oracle Corp.'s Oracle7 relational database software will have an option for fingerprint-recognition capability, company officials said last week.

Redwood Shores, Calif.-based Oracle has partnered with Identix, Inc. in Sunnyvale, Calif., to offer fingerprint recognition through Identix's TouchNet II.

To use the identity verification system, users place their finger on a glass plate embedded in a mouse-size unit that plugs in to their PC. An optical scanning system reads the print and converts it to algorithms.

The unit also verifies that the finger is live by checking blood flow and other characteristics.

The computer then matches the print to one on file before granting or denying access.

Sykes writes for IDG News Service.

your job description needs to be updated to include the part about the rabbits.

FRANKLY SPEAKING

Everybody get Web-happy

FRANK HAYES

HANG ON, folks. They're about to shift the paradigm on you again.

This time the panacea that pundits are proffering is the Internet as middleware — the Web as your client/server infrastructure.

Here's the idea: Now that Netscape and Microsoft have decided the Web browser is the new universal user interface, you'll have to Web-enable all your applications anyway, right? So why not go all the way? Put all your applications on Web servers, beef up the Web's security and reliability, and before you know it, you'll finally have a network that really does tie together all the information resources scattered throughout your organization.

Which, of course, is also what the last great paradigm — client/server — was supposed to do for you.

THERE'S A CATCH

There are just two catches to this Web-happy vision. First, making all your applications Web-enabled is no picnic. Sure, vendors will add Web connections to their commercial products. SAP will browser-ize R/3, and PeopleSoft will Web-enable its human resources system.

But you've still got plenty of homegrown programs that you'll need to tie in to the Web. You can't get rid of them, and you can't ignore them — if you could, you'd have torpedoed those legacy applications long ago. No, for whatever reason, you're stuck with them. And you're on your own for the job of turning that dusty Cobol code into a Web server.

Then there's the second catch: the fact that the Web was never designed for enterprise applications. It was designed to fetch and display text and pictures, and its core standard — Hypertext Markup Language, or HTML — does that very nicely.

But what's the standard way of performing a transaction across the Web? What about checking a business rule? Or communicating among independent programs?

Answer: Those Web standards don't exist. You can do those things, but the approaches are all over the map.

In other words, the Web as middleware is perfect — as long as you don't plan to use capabilities that real enterprises depend on every day in their distributed systems.

In fairness, some vendors are trying to get their standards together. SAP, PeopleSoft and other vendors of packaged enterprise systems are working on a standard set of programming interfaces. But finished products are years away. Messaging vendors are still going in all directions. And Microsoft and Netscape can barely keep their versions of HTML compatible.

So what can you do? Well, you could roll over and accept whatever mishmash of conflicting Web interfaces vendors decide to give you. Or you could roll up your sleeves and start designing your own standards.

Figure out what a transaction is in your organization, then make sure you build all your Web transactions that way. Decide on a syntax for how programs will communicate on the Web, then stick to it.

Your standards may not be as elegant as the best the industry could come up with. But the industry isn't coming up with anything just yet. And if you want to use the Web for real distributed systems sometime before the paradigm shifts beneath you again, you're on your own.

Hayes is Computerworld*'s staff columnist. His Internet address is frank_hayes@cw.com.*

SHORTS

Simpler queries

IQ Software Corp. this week will introduce a version of its database reporting software with a simplified user interface for creating ad hoc queries. Until now, the Norcross, Ga., company's IQ/Objects software has been aimed at power users who want to produce sophisticated reports. Version 6.0 retains those capabilities but adds a companion QuickQuery interface and local data caching support. Prices start at $250, with shipments scheduled for mid-March.

Oracle licenses objects

Oracle Corp. has licensed object request broker software from Visigenic Software, Inc. in San Mateo, Calif. It will resell the products as part of its Network Computing Architecture. Oracle, in Redwood Shores, Calif., can also integrate the technology into its databases, tools and applications. Oracle licensed the Java and C++ versions of VisiBroker and its VisiBridge software for linking ActiveX clients to applications that support the Common Object Request Broker Architecture.

Warehouse monitors needed

CONTINUED FROM PAGE 43

fend for themselves when it comes to keeping tabs on their data warehouses and reduced-scale data marts, which are pools of historical information that companies can use to analyze operations and find trends that could yield a competitive advantage.

"There needs to be a lot more emphasis on this out in vendor-land," said David Buch, director of data warehousing at Capital One Financial Corp. in Falls Church, Va. The credit-card company runs six big data marts, totaling about 2T bytes of information, on Oracle Corp. databases.

After being unable to find suitable packaged tools for monitoring ad hoc queries, Capital One wrote some itself, Buch said. But it mostly relies on personal contacts with end users to stay informed about the kinds of questions being asked. Buch said he has staff members "whose sole job is to keep close to a specific business area."

NOTHING AVAILABLE

"There's absolutely nothing out there that provides an answer across the board," said Michael Wade, senior manager of revenue reporting systems at MCI Communications Corp.'s business markets group in Atlanta. The market for data warehouse management tools "is still very fragmented," he added.

Start-ups Intellidex Systems LLC and Pine Cone Systems, Inc. hope to change that. Englewood, Colo.-based Pine Cone announced a set of data warehouse monitoring tools late last month. Intellidex, in Winthrop, Mass., recently released software for managing metadata, the explanatory information that end users rely on to navigate through warehoused data (see chart, page 43). The two companies promised to integrate their products by fall.

Demand for management and monitoring tools "that let you sleep at night" should become heavy by the end of the year as more data warehouses go into production, said Alan Paller, director of research and education at The Data Warehousing Institute in Bethesda, Md.

But both companies are still in their infancy. Pine Cone has just 17 employees and until recently operated out of its founder's house. And data warehouse managers at Intellidex's two beta-test sites — BankBoston Corp. in Boston and The Hartford insurance company in Hartford, Conn. — said they still use its software only in limited-scope development projects.

Intellidex's metadata manager was being developed within BankBoston until last July, when it was spun off into a separate company that is still partially owned by the bank.

Beth Hassinger, manager of information infrastructure at BankBoston, said controlling metadata is "the No. 1 challenge and frustration that data warehouse managers have to take on today." But even the bank hasn't put together definite plans for making wide use of the Intellidex software, she said.

Visual Basic's power comes at cost

CONTINUED FROM PAGE 43

mingham, Mass., said the improvements in Version 5 have long been on developers' wish lists.

"Historically, Visual Basic's speed and performance have been attacked," Quinn said. "That's absolutely one of Visual Basic's remaining sore points. Everywhere you look, they're making performance improvements. Microsoft has really wanted to address this issue once and for all."

New Technology Solutions, which offers Visual Basic training, has put step-by-step control creation tutorials on the World Wide Web to help developers get up to speed. Find them at www.vb-bootcamp.com.

Version 5's advanced features include the addition of a native code compiler, high-speed data access and an improved development environment. Microsoft officials said Visual Basic 5 applications can be accessed about 17% faster than those built with Version 4.

And some users said the trade-off of simplicity for power is well worth it.

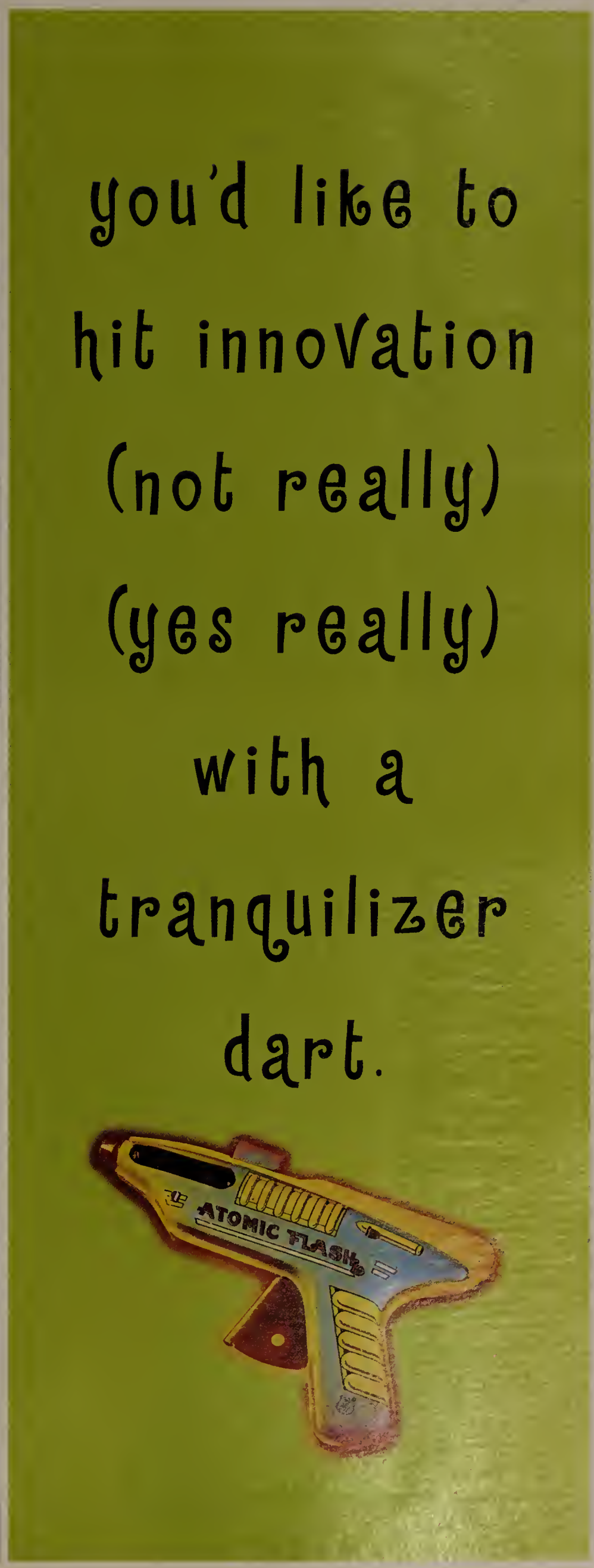
Dave Lingren, director of advanced development at New York-based Dunsgate, a company of The Dun & Bradstreet Corp., said, "It finally turns the corner in turning [Visual Basic] into an industrial-strength tool. After living through [Version 4], we're now getting a lot of the things we wanted."

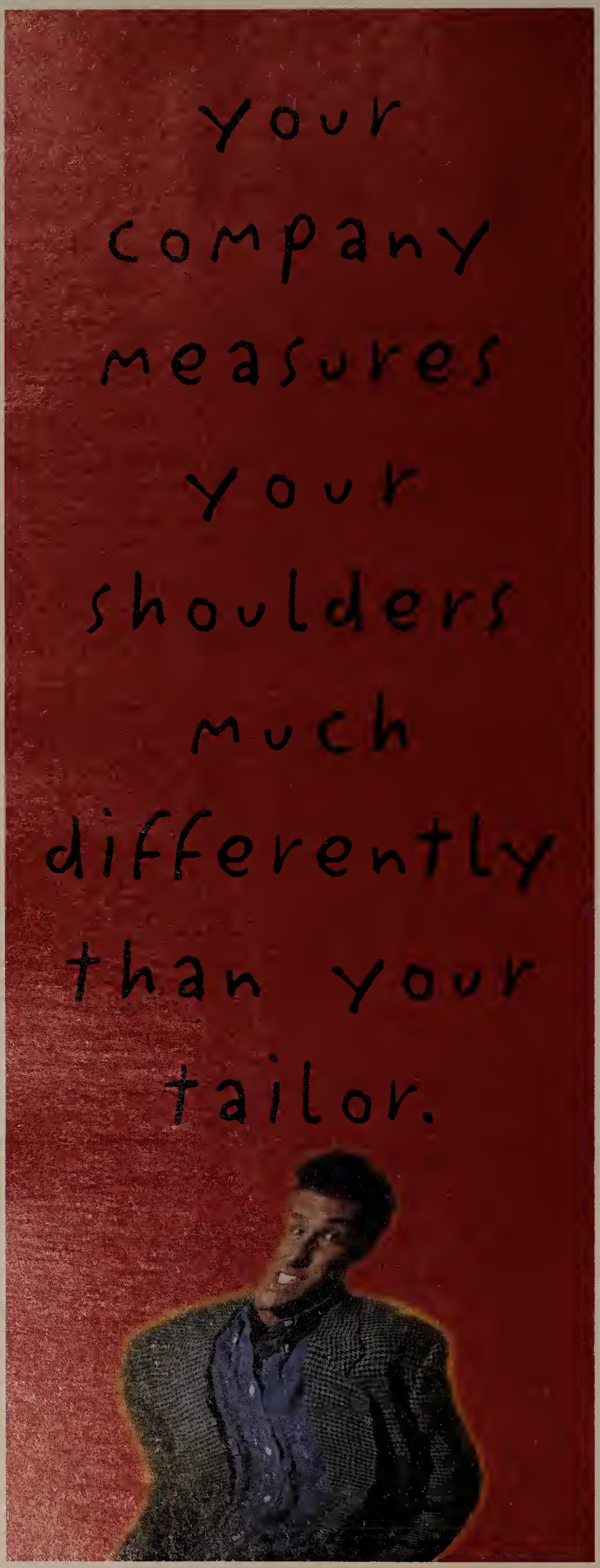
Lingren noted that Version 4 was the first version that let developers create their own components. "That was a big change," he said.

"It took a lot of getting used to. [Version 4] always felt a little unfinished. It wasn't very reliable. The remote automation and advanced features didn't work quite right. The component manager was sort of a placeholder for real capabilities that they gave us in this release," Lingren added.

Conservative estimates place the number of Visual Basic users at about 2.5 million.

By comparison, the Visual C++ community is only 500,000 strong.





OLAP/Web combination allows better data analysis

By Ron Condon

A COMBINATION OF two technologies — online analytical processing (OLAP) and the World Wide Web — may give companies the kind of control over data that previous analysis techniques have failed to deliver.

According to a report on OLAP from Ovum Ltd., a research organization in London, Web-based OLAP will make sophisticated data analysis available to a wide audience.

Web-based OLAP will be a key application for intranets as users go beyond simple information publishing. It will offer users a simpler and cheaper way to access an organization's data warehouse.

The Ovum report acknowledged that Web clients are limited compared with full OLAP clients and that performance may be slow over an intranet.

OLAP lets users work intuitively with data and concentrate on business concepts such as profits, sales, products or customers. The addition of Web access makes OLAP technically and financially feasible to supply all decision-makers in an organization with the tools they need, according to the report.

The rise of OLAP is tightly linked to the growing use of data warehouses and data marts, which package data in an easy-to-analyze form. As users take on more responsibility for accessing and analyzing data without help from information systems departments, IS professionals will spend more time building components and templates for end users, according to the report. IS also will be able to direct more energy toward managing an increasingly complex information infrastructure.

Condon writes for IDG News Service in London.

Norton Utilities fixes NT

CONTINUED FROM PAGE 43

files in our data applications, so we get thousands of small files that could be susceptible to fragmentation," Williams said.

LiveUpdate is also convenient, Williams said, because he doesn't have to wait for a disk to download antivirus protection.

CALLING DR. NORTON

Norton Disk Doctor, another feature, can detect hard-disk problems such as file overwrites and deletions. The utility places the files in a recycle bin in a protected area.

In addition to improving performance by defragmenting files, Speed Disk also monitors fragmentation and notifies users when the drive needs to be optimized.

"It really increases the performance that was lost because of fragmentation," said Volker Crocco, a technical consultant at E3 Systems Integration, a systems integration company in Anchorage, Alaska.

"I optimize my drive about once a week," Crocco said.

He said he also uses the Symantec Web site as a convenient way to download software patches for Norton Utilities for NT 4.0.

Norton Utilities for NT 4.0 requires an IBM or compatible PC that runs Windows NT 4.0 Workstation or Server, 8.5M bytes of free hard-disk space, 16M bytes of RAM and a dual-speed CD-ROM drive.

It is available now and costs $99.

Survey shows Unix holding off NT

By Laura DiDio

IS WINDOWS NT SERVER everywhere? Not quite yet, according to a survey by Forrester Research, Inc. in Cambridge, Mass.

A survey of 50 senior information technology managers at Fortune 1,000 companies found that IT managers are embracing Microsoft Corp.'s NT Server for traditional LAN applications such as file, print and electronic mail. But the managers said they will continue to rely on tried-and-true Unix systems for large databases and transaction processing systems. Fully 76% of the Forrester respondents said their long-term strategic server operating system plans include Unix and NT Server, said Jon Oltsik, the Forrester analyst who wrote the report. On the matter of scalability, 66% of the IT managers said Unix scales well. Nearly the same percentage, 62%, said Windows NT Server doesn't.

Microsoft's technical service and support drew criticism in the survey. An overwhelming 80% of the users characterized the Redmond, Wash., software giant's support as "adequate at best."

Oltsik said NT Server's low cost, desktop connectivity and ease of use are seductive. But Fortune 1,000 accounts are put off by the product's immaturity and limited scalability, he said.

NEW PRODUCTS

MICRO FOCUS LTD. has announced Micro Focus PL/1 Extension for Revolve/2000 to automate many year 2000 date-conversion tasks, including inventory analysis to determine which software parts belong to an application.

According to the Palo Alto, Calif., company, Micro Focus PL/1 Extension was designed to allow Revolve/2000 to identify program logic that needs repair and provide analysis of how changes in one area will affect other areas.

It costs $1,500 per user.

Micro Focus
(415) 856-4161
www.microfocus.com

LATITUDE COMMUNICATIONS, INC. has announced MeetingPlace WebPublisher, software to integrate the MeetingPlace conference server with a company's existing intranet or World Wide Web sites.

According to the Santa Clara, Calif., company, WebPublisher lets a browser user schedule conferences, access meeting materials and listen to recordings using a telephone or RealAudio-enabled Web site.

The WebPublisher software costs $4,995. A MeetingPlace conference server costs $39,995.

Latitude Communications
(800) 999-7440
www.latitude.com

AVENTAIL CORP. has announced AutoSocks 2.0, firewall-traversal client software.

According to the Seattle company, AutoSocks 2.0 enables any Internet Protocol client application to securely traverse any existing Socks V4- or V5-based firewall or server.

Pricing starts at $49.

Aventail Corp.
(206) 777-5600
www.aventail.com

PKWARE, INC. has announced PKzip for Windows, compression utility software.

According to the Brown Deer, Wis., company, PKzip's latest release was designed for operating environments found in Windows 95 and Windows NT. It can create self-extracting archives that can create a program and register an extension in Windows 95.

PKzip for Windows costs $49.

PKware
(414) 354-8699
www.pkware.com

INFRASTRUCTURES FOR INFORMATION, INC. has announced a desktop edition of its Standard SGML Support System that lets users make existing desktop applications compliant with Standard Generalized Markup Language (SGML) without replacing the information infrastructure of a program.

According to the Toronto company, S4-Desktop 2.1 can be embedded in existing word processors, composition tools and other applications. S4-Desktop has an SGML application server in addition to the desktop software.

Pricing starts at $1,500 per license, plus $149 per seat.

Infrastructures for Information
(416) 920-6493
www.i4i.org

ACCELERATOR SOFTWARE INTERNATIONAL CORP. has introduced SuperFassst, an acceleration software product designed to boost hard-disk performance by up to five times its original level.

According to the Seattle company, the product can also reduce application launch times by up to 75%.

The product uses a hard-disk accelerator, an application accelerator with a drag-and-drop interface and a multitasking accelerator.

SuperFassst costs $59.95.

Accelerator Software International
(800) 754-1128
www.accelerationsw.com

DATASTREAM SYSTEMS, INC. has announced MP2 Enterprise, maintenance software for enterprise use.

According to the Greenville, S.C., company, MP2 Enterprise can help maintenance workers investigate equipment downtime and provide precise plant-level reporting regarding equipment, purchasing, security and other areas.

MP2 Enterprise costs $9,995 for the first five seats.

Datastream Systems
(800) 955-6775
www.dstrm.com

I-LOGIX, INC. has announced an interface that links its Statemate Magnum with Integrated Systems, Inc.'s Matrixx Autocode.

According to the Andover, Mass., company, the code-to-code interface lets designers use both tool sets to graphically model, simulate and verify the behavior of a system in a virtual prototyping environment.

The Statemate Magnum interface to Matrixx costs $5,000.

I-Logix
(508) 682-2100
www.ilogix.com

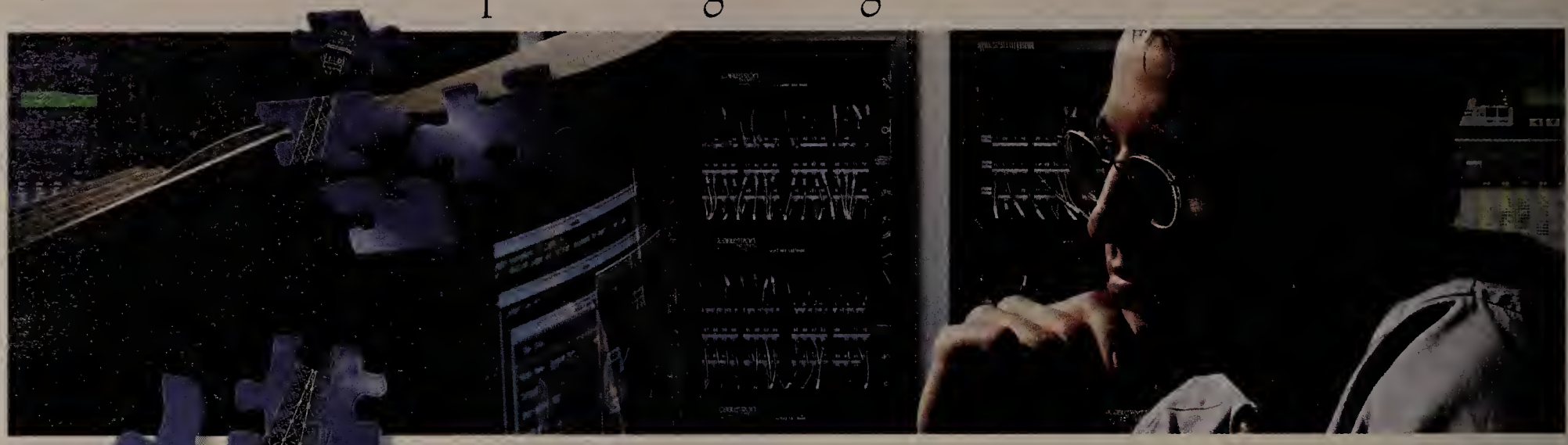
UNION PACIFIC TECHNOLOGIES has announced PQMPlus 2.0, a productivity and quality measurement system for application development.

According to the St. Louis-based division of Union Pacific Corp., PQMPlus was designed for project estimates, scheduling, risk and corporate value assessments and productivity analysis. The system lets users buy the complete system or individual modules, which include PQMPlus Manager, PQMPlus Analyst and PQMPlus Planner.

The complete system costs $5,900, and each module costs $2,000.

Union Pacific Technologies
(800) 776-0679
www.up.com/upt

Remember when all the pieces fit together right out of the box? **We do.**



Network solutions from Cabletron. A simpler way to work.

Today's enterprise networks are such a complex maze of disparate parts that it can be difficult to keep the system running, let alone stay focused on the big picture. Wouldn't it be great to have a flexible, seamless solution that ensures what you buy today works with what you'll require tomorrow?

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So whether you're laying out your company's strategic network puzzle or just piecing together this year's bandwidth needs, Cabletron truly does offer a simpler way to work.

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LANs • WANs • Network Management

Briefs

Sniff both sides

Network General Corp. next month plans to ship a portable version of its protocol analysis tool for troubleshooting LAN functions that extend across WAN links. WAN Sniffer Analyzer NB runs on a notebook PC to help narrow a problem to the WAN service, the router, the logical communications path or the application. The Menlo Park, Calif., vendor will set prices in March.

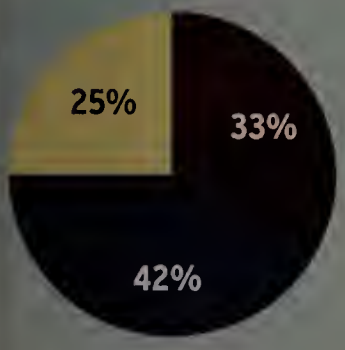
Auto-browsing

Managers and users can control any Windows desktop across the Internet or corporate intranet with remote access software from Stac, Inc. in San Diego. ReachOut 7 runs on Microsoft Corp.'s Windows NT 4.0, Windows 95 and Windows 3.1. Users can remotely control desktop functions and applications from Microsoft's Internet Explorer or Netscape Communications Corp.'s Navigator. ReachOut 7 costs $139. An Internet-only version, ReachOut Global, is available for free at www.stac.com.

PowerPC dropped

Microsoft will phase out development of its Windows NT operating system for computers that use the PowerPC chip. This follows similar moves by IBM and Motorola, Inc.

What are your plans for an X.500 mail directory?



Base: 53 IS professionals

Source: Radacati Group, Inc., Palo Alto, Calif.

USTrust casts a wider net

▸ *Includes NT/NetWare mix in network revamp*

By Laura DiDio
CAMBRIDGE, MASS.

MATT RICE, vice president and senior network manager at USTrust, says there is a place for every network technology and that many have a place in his organization.

That's why when USTrust needed a way to let its users access data across the enterprise, automate account openings and link host-based data to Windows applications, it opted for a dual network operating system strategy.

As part of its massive network upgrade, USTrust will install Novell, Inc.'s IntranetWare 4.11 at the enterprise level and Microsoft Corp.'s Windows NT Server as an application server in all remote branches.

The bank has deployed LANtegrity network recovery software from Network Integrity, Inc. in Marlboro, Mass., to protect all corporate data in Net-

USTrust, page 50

BILL LISENBY

State Street's Tom Stenson: Vendors need to support more protocols than just IP

Switching strategies get clearer

By Bob Wallace

THE INTERNETWORKING LAN-scape became clearer for network managers recently as top technologists from the Big Four — Cisco, Cabletron, Bay and 3Com — lifted the fog from their switching strategies.

At ComNet held recently in Washington, Cisco Systems, Inc. took heat for the lack of clarity in its overall switching strategy while all four leading internetworking vendors promised product enhancements that will help users cut costs and simplify administration of their

Switching, page 50

GROUPWARE INTEGRATION

IBM/Lotus merger begins to benefit users

By Barb Cole and Tim Ouellette

IBM AND Lotus Development Corp. users are starting to see benefits accrue from the melding of the two companies.

For IBM shops, the Lotus buyout has resulted in new versions of Lotus' Domino messaging and World Wide Web server for IBM mainframe and midrange platforms. Those versions are like stamps of approval that the platforms are still viable, users said.

Lotus users have gained a sharper focus on enterprise issues, such as scalability and reliability, and products to help them move from mainframe messaging systems to Domino.

"I view IBM's core competency as expertise in enterprise deployment, and that's very much what Lotus needs," said Joseph Sisolak, assistant vice president of Johnson & Higgins in New York, which has 8,000 Notes seats.

SUPPORT ISSUES

Tim M. Crawford, a technical project manager at National Semiconductor Corp. in Santa Clara, Calif., said, "I would be concerned if IBM took over the day-to-day operations of Lotus because that would slow down [Lotus] too much."

He said IBM should continue to get involved only in the areas where Lotus needs help, such as improving Lotus' technical support (see story, page 52) and providing the money to heavily market Domino in a competitive Web server market.

IBM/Lotus, page 52

McAfee extends tools to mixed networks

▸ *Vendor adds links, NT support to Saber LAN*

By Patrick Dryden

MCAFEE ASSOCIATES in Santa Clara, Calif., last week pushed its workgroup management suite closer to enterprise capability with several promised enhancements.

A new version of Saber LAN Workstation, the heart of the McAfee Enterprise line introduced in September, supports Microsoft Corp. Windows NT and Novell, Inc. NetWare environments in a common Windows 95 interface.

The previous version didn't fully support Windows NT Server or NT Workstation.

The new version also more tightly integrates the suite's tools with links to other key management platforms.

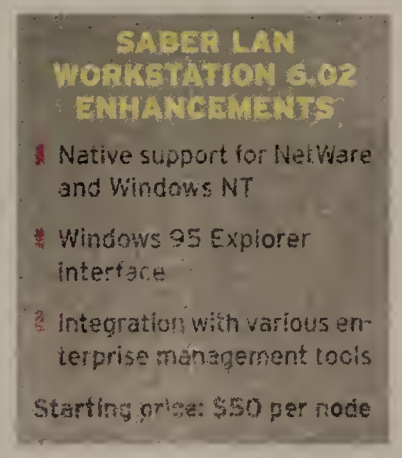
At The Chase Manhattan Bank Corp., the changes simplify daily user-support chores such as desktop control and distribution of new or upgraded software to diverse clients.

MORE OPTIONS

"This helps us tie together about 10,000 desktops running all three varieties of Windows under defined NetWare user groups," said Michael Montalto, vice president of the developing and distributed technology services group at the New York bank.

With Saber LAN Workstation running on these networked PCs, menus and scripts control each user's application options.

McAfee, page 50



Microsoft offers NT Server help

Domain Planning Guide available for free

By Laura DiDio

USERS OF Windows NT Server 3.51 and 4.0 who have been befuddled by the daunting process of setting up domain trusts to manage networks can now get some free help.

Microsoft Corp. has created a series of step-by-step Domain Planning Guides available for free downloading from its World Wide Web site, said Mike Nash, director of marketing for Windows NT Server.

The guides include an overview of the components of a Windows NT network and the basic concepts required to administer a domain. Also included is a list of frequently asked questions.

Microsoft officials and expert NT users advise that whenever possible, users should build an organization's Windows NT network in a single administrative domain rather than try to administer complex relationships among multiple domains.

"If you can't, then the best alternative is to minimize the number of domains and to try not to put too many users in a single domain, because it will be unwieldy to manage," said Mark Minasi, president of TechTeach International, Inc. in Arlington, Va.

Minasi and Mike Fink, chief technology officer at Systron, Inc., a systems integrator in New York, also advise users to plan intelligently.

"Start by collecting NT user accounts into the smallest number of domains possible. Then give each department its own domain, and put all the servers into that domain," Minasi said.

From there, Fink said, users should build trust relationships from the departmental domains to the user domains. "This is the simplest approach to designing and managing multidomain networks," he said.

Microsoft's Domain Planning Guide can be found by going to www.microsoft.com/ntserver and clicking on the Planning and Deployment option.

McAfee upgrades management suite

CONTINUED FROM PAGE 49

Saber LAN Workstation also allows central IS operators to automate their response to users who request applications by coordinating NetWare logins with the tool's software distribution.

Because the bank is migrating to NetWare 4.0, Montalto said he needs the new Novell Directory Services (NDS) support in McAfee's tool kit. It will give operators a single repository for menus and a uniform way to define and distribute software by using the NDS tree, he said.

The Windows 95 Explorer interface will better tie each client to the NetWare server back end, Montalto said, "so users can move among machines and have a consistent interface."

Montalto said he is glad to see this tool kit integrate with enterprisewide tools because the bank, like many large organizations, seeks a broad systems management platform.

McAfee's suite can exchange management information with BMC Software, Inc.'s Patrol, Hewlett-Packard Co.'s OpenView Network Node Manager, Network General Corp.'s Distributed Sniffer and Tivoli Systems, Inc.'s TME 10.

But McAfee doesn't yet support other major enterprise-scale managers and won't extend its tools to manage Unix systems and applications until later this year.

Saber LAN Workstation 6.02 is available now. Pricing starts at $50 per node.

Switching vendors

CONTINUED FROM PAGE 49

LAN internetworks.

Cisco confirmed it will add advanced routing technology to its widely used Catalyst 5000 switches. Layer 3 switching technology eliminates the need for stand-alone routers in switched networks.

By eliminating router bottlenecks, Layer 3 switching also markedly boosts the amount of traffic that can pass over networks.

"Layer 3 switching promises improvements in both [network] price and performance over earlier switches," said Dave Meyer, a senior network engineer at the University of Oregon in Eugene. "We're talking about higher port density at lower costs." The university has multiple Catalyst 5000s.

NETWORKING EQUIPMENT

Cisco, in San Jose, Calif., also came under fire from analysts for its many and varied switching schemes, the latest being NetFlow Switching and Tag Switching.

NOT APPLE PIE

How all the schemes fit together isn't clear, said Tom Nolle, president of CIMI Corp., a consultancy in Voorhees, N.J.

"An arbitrary mix of apple and dough does not make apple pie," Nolle said. To which a Cisco executive admitted: "We clearly have to do a better job tying them together within our CiscoFusion architecture. The technology is there; we just need to go back and work on [clarity]."

Bay Networks, Inc. in Santa Clara, Calif., also said it is moving aggressively to develop Layer 3 switching technology for its flagship System 5000 hub.

And Cabletron Systems, Inc. in Rochester, N.H., confirmed its plans to broaden SecureFast's protocol support to include Apple Computer, Inc.'s AppleTalk and Digital Equipment Corp.'s DECnet. The product also supports Novell, Inc.'s IPX and IBM's NetBios protocols in addition to Internet Protocol, but many Cabletron customers said they thought it supported only IP.

MORE THAN IP NEEDED

Customers called the expanded protocol support good news.

"For the next couple years, an IP-only approach will not be sufficient for us as we still have some IPX and little bits if AppleTalk and DECnet as well," said Tom Stenson, vice president of network architecture and planning at State Street Bank in Boston.

3Com Corp. in Billerica, Mass., said it plans to extend its Fast IP switching scheme, already available on adapter cards for PCs, to include workstations. The vendor claims to have shipped 40 million adapter cards so far.

USTrust picks IntranetWare, NT

CONTINUED FROM PAGE 49

Ware file servers and customer loan and account databases.

"We need a best-of-breed network. And I don't believe any one network operating system today can do it all," Rice said.

INSTANT INFO

The network upgrade will give customers instant access to information and open accounts and clear checks faster than before, which will help the bank stay competitive, said Ron Blankman, USTrust's senior vice president of information systems.

The Boston-based company is upgrading its 31 NetWare 3.x and 4.x servers to IntranetWare. The bank chose IntranetWare over Windows NT Server primarily because of Novell Directory Services (NDS), which lets Rice build a centrally managed hierarchical database of all users, objects and devices on the network.

"We have a true, distributed wide-area environment, which has grown from 28 branches to about 70 offices," said Rice, who said NT Server would have made managing that network unwieldy. "Windows NT Server would have required me to build multiple domains and goose up my entire frame-relay network to build in redundancy," Rice said.

But NT Server does fit as a branch-office application server that runs Microsoft's SQL Server and SNA Server BackOffice applications, he said. USTrust is replacing its existing complement of IBM 4702 dumb terminal teller stations with PCs that run Windows 95 and Sell Station banking automation software from Electronic Data Systems Corp. in Plano, Texas.

Terri Nace, branch manager at a USTrust office in Boston's Kenmore Square, said account-automation software that runs on NT made her location more efficient and noticeably improved customer service.

"Windows NT Server lets us respond more quickly and professionally to customers," Nace said.

The second phase of USTrust's network upgrade is to link the remote Windows NT Servers to the corporate IntranetWare servers and NDS by June, using Windows NT Gateway Services, which makes an NDS subdirectory look like an NT shared directory, Rice said.

"This will allow us to access all of the bank's databases and customer accounts," Nace said.

Nancy DiGregorio, a USTrust microcomputer specialist, said the upgrade to IntranetWare and the LANtegrity data recovery and backup system makes crisis situations less dire, and NDS makes user administration and log-in easier.

Prior to installing LANtegrity last year, USTrust relied on Novell's SFT III to guard against network failures. However, SFT III protected the bank only against hardware failures, not software crashes, Rice said.

Matt Rice, vice president and senior network manager at U.S. Trust in Boston, said before he switches from NetWare to Windows NT, Microsoft will have to add the following:

- A bona fide hierarchical directory service
- A suite of proven enterprise management tools that go beyond performance monitoring
- Support for disk quotas so users don't exceed their limit and crash the system or server
- The ability to restrict mainframe log-ins to one log-in per user
- Real monitoring tools to oversee which servers generate network traffic and statistics

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NEW PRODUCTS

SPECTRAFAX CORP. has introduced Fax Liaison, a voice/fax information management system that allows automatic forwarding of electronic-mail messages by fax and other functions.

According to the Naples, Fla., firm, Fax Liaison fills World Wide Web information requests by fax and lets users access faxes and send E-mail from one mailbox.

Pricing starts at $16,000.

Spectrafax
(941) 643-5060
www.spectrafax.com

ENVELOPE MANAGER SOFTWARE has added ZIP+4 look-up options to its Dial-A-Zip software, which allows verification of addresses and ZIP codes using a TCP/IP connection over the Internet or an intranet without launching a browser.

According to the Palo Alto, Calif., company, the technology identifies the two-digit information essential for creating delivery-point bar codes. It costs $1,650.

Envelope Manager Software
(415) 321-2640
www.envmgr.com

MONTEREY SOFTWARE GROUP has announced Cryptocard for use with its Safe/3000 access control and auditing product. According to the Cupertino, Calif., firm, Cryptocard is a credit-card-size token that enforces secure identification and authentication of users on the Internet, intranets and public networks. Tokens cost $60.

Monterey Software
(408) 253-1778
www.editcorp.com/businesses/montereysoftware

IBM enhances its OS/2 Warp Server

By Laura DiDio

IBM HAS GIVEN its OS/2 Warp Server a boost by improving support for Windows clients and reducing some of the hassles of LAN administration.

The enhancements include a Windows 95 client, a Windows NT Workstation client and a Network Neighborhood enabler. They provide Windows desktop users with the same level of functionality they would have on a Windows NT Server network, an IBM official said.

Beta user David Ashlock, staff network administrator at DST Systems, Inc. in Kansas City, Mo., said he likes the ease of use provided by the improved Windows clients for OS/2 Warp Server.

EASIER TO USE

DST's Windows 95 users can now access OS/2 Warp Server with one primary log-on because user identifications and passwords are validated by the Warp Server.

"It's simplified our log-on and password changes, which is a big plus for us," Ashlock said. "And it's made it much easier for our Windows 95 users to access OS/2 Warp Server resources, directories, printers and applications."

By enhancing the integration of Windows 95 and Windows NT Workstation with OS/2 Warp Server, "IBM is tacitly acknowledging the desktop war is over and Microsoft has won," said Jim Greene, an analyst at Summit Strategies, Inc. in Boston.

At the same time, though, Greene said OS/2 Warp Server is still a very viable network operating system, with 15% of the worldwide installed base.

"IBM doesn't want its customers to have even the slightest reason to yank out Warp Server in favor of Windows NT Server," he said. "By giving Windows desktop users an easy way to manage logins and authentications as though they were attached to a Windows NT Server, MIS managers will say, 'Why bother changing? This works fine.'"

ALSO IN STORE

Other improvements include the ability to store and retrieve Windows 95 and Windows NT Workstation desktop preferences, user profiles and system policies from the OS/2 Warp Server.

System administrators can use those system policies to ensure that Windows users retain access privileges to all network resources regardless of users' geographic locations.

Network administrators can also set system parameters and access rights for all Windows clients.

The Network Neighborhood enabler gives users the same "look and feel" of a Windows desktop interface to browse the OS/2 Warp network and access network resources.

IBM OPENS WINDOWS

IBM's Windows clients for OS/2 Warp Server

Features:

- A single user log-on and password authentication
- The ability to store and retrieve Windows preferences and systems policies
- Access privileges to all OS/2 Warp Server directories, databases and files

Availability:

- Windows 95 client now available
- Windows NT Workstation client and Network Neighborhood Enabler will be available in March

Price: Free

IBM/Lotus mix benefits users

CONTINUED FROM PAGE 49

Since IBM bought Lotus in June 1995, the companies have announced plans to integrate several key products. Most recently, Lotus announced plans to deliver Domino on the S/390 later this year and on the AS/400 early next year.

"We see [their] plans as a positive sign that the AS/400 will continue to evolve and remain as a strong business tool for our shop," said an AS/400 manager at a New Hampshire manufacturing company, who requested anonymity.

IBM and Lotus also have been stitching IBM's MQSeries middleware tightly with Domino. MQSeries delivers data between different applications on different platforms via secured data messages.

For example, Lotus' Domino.Connect middleware includes a LotusScript extension, called the MQSeries plug-in, that lets any LotusScript program directly access MQSeries. This gives Domino users better access to enterprise applications and gives MQSeries a simple interface with users via Domino.

DATABASE PRODUCT

A new product, the MQSeries Enterprise Integrator, will simplify the details of legacy transaction systems for Domino programmers. The product, which will ship this year, will let users access unmodified IBM CICS, MQSeries and IMS applications and integrate Domino's authentication services with access controls on mainframe databases.

To provide a complete process, Domino must be able to interact with applications such as CICS, said Ron Berry, a technical risk analyst at Barnett Banks, Inc. in Jacksonville, Fla. Now Notes and Domino can become data entry systems that are tied directly to the enterprise network rather than just ways to process electronic-mail and workgroup applications, he said.

Search for a fix

About 10,000 Lotus customers cheered when IBM chairman Louis V. Gerstner announced last month at Lotusphere 97 that the parent company would make "fixing Lotus support" a priority in the year ahead.

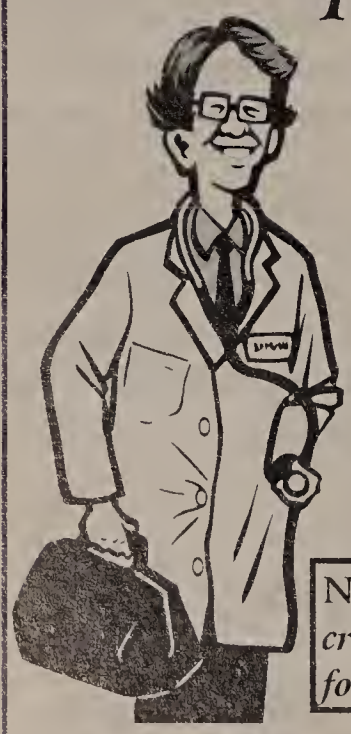
IBM has a reputation for keeping corporate giants happy with responsive support, but Lotus' reputation for support is less sterling.

And since the number of Notes seats has swelled to more than 9 million, it is getting harder to get good support, according to Notes users interviewed at the conference.

Lotus officials said the company is working with IBM on a plan to improve support. They will announce details next month. Lotus declined to specify what changes will take place. But sources close to the plan said IBM will play a larger role in assisting Lotus customers. — Barb Cole

MEDICAL ALERT...

Unix "vi" Editor Linked to Premature Baldness



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Powerful Keynote Sessions

John Cross
British Petroleum

John Singel
Price Waterhouse

Naomi Seligman
Research Board

Kicking off ETS '97 is John Cross, General Manager of IT for British Petroleum PLC. Cross discusses the "Transformation of the IT Function at British Petroleum" as they moved from a mainframe VMS environment to client/server. A special Integrator keynote has been added to the program this year, featuring John Singel, National Internet Technology Domain Leader of Price Warehouse. The closing keynote is provided by Naomi Seligman, Senior Partner of the Research Board, who covers some of the data collected by her exclusive organization.

Technology Provider Strategy Panels

Here is your chance to hear from a senior level IT executive from an ETS sponsor company in a moderated panel format.Corporate strategies and future directions are revealed, as well as answers to questions about new technologies and emerging trends. Hear their stories and learn what you need to know about these companies in order to make beneficial IT investments.

Technology Panels

The following three, 60-minute case-study panels discuss technology applications and implementation, including performance expectations, scope, process and return on investment.

Distributed Computing

Monday, May 19, 1997

Moderated by: Alan Alper
Editor, Magazines Group
Computerworld .

The effective use of distributed computing technology raises new challenges for the IT executive. The following issues will be discussed to help you separate promises from reality and to effectively estimate the impact on your resources:

- migration of existing systems
- increased need for object-oriented development
- systems management procedures
- user file management and related fundamental security issues
- adequate hardware and software componentry
- language standards and interoperability

Data Mining and DataWarehousing

Tuesday, May 20, 1997

Moderated by: Alan Paller
Director, Research and Education
Data Warehousing Institute

Many issues plague the IT executive attempting to implement a successful data warehousing or data solution for their enterprise. Here's your opportunity to get the answers to the following questions:

- what kind of infrastructure is necessary to support the amount of data that will be stored and processed?
- do I need a relational database or multi-dimensional database?
- what set of tools will most appropriately support end-user needs?
- should analysis happen on the desktop or on the server and who has what level of access?
- search engine, text retrieval engine and sort processesing options

Doing Business with Internet Technologies

Wednesday, May 21, 1997

Moderated by: Gay Slesinger
Vice President
Giga Information Group

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CW

Faster phone links move toward reality

▸ *DSL-based Internet services expected to be widely available by next year*

By Kim Girard

AS USERS WAIT for carriers to deploy Digital Subscriber Line (DSL) technology for high-speed Internet access, vendors are working at a frenzied pace to roll out better and less expensive equipment.

Analysts said they don't expect DSL to be widely available until next year. But DSL products — many of which were unveiled this month at ComNet in Washington — are expected to make the technology a viable alternative to frame relay, Integrated Services Digital Network (ISDN) and other high-bandwidth, remote access technologies.

DSL technology uses regular telephone lines to send data at megabit rates that far outstrip ISDN, which transmits data at 128K bit/sec.

Paradyne, a network access company in Largo, Fla., and a division of AT&T Corp., recently announced its XDSL product line, which includes an access concentrator that will allow service providers to connect up to 576 DSL ports to IP or frame-relay networks.

DSL's megabit speeds on ordinary phone lines far surpass ISDN, which is limited to 128K bit/sec.

Paradyne also announced a deal with wide-area networking provider Network Access Solutions in Sterling, Va., under which Paradyne would supply DSL products. The carrier would also provide DSL connections to Internet service providers in the mid-Atlantic region.

The service, called CuNet, bypasses the public switched telephone network to supply a DSL connection directly between the Internet service provider and the end user. Network Access Solutions initially will offer the service to Internet providers in the Washington area and expand nationwide by year's end.

PAY AS YOU GO

NetSpeed, Inc. in Austin, Texas, also recently announced a DSL access multiplexer. Much of the new DSL equipment was designed to be used with full-time connections from the user to the access server. But NetSpeed's product enables carriers to offer users access to dial-up modems.

NetSpeed's multiplexer will allow users to pay for what they need, rather than spend their money on a dedicated line, said Kieran Taylor, an analyst at TeleChoice, Inc., a consultancy in Verona, N.J.

On the carrier side, US West, Inc.'s Interprise group has introduced Integrated Digital Subscriber Line to its business customers. The service is a DSL/ISDN hybrid that will provide 128K bit/sec. access. US West is also rolling out High-bit-rate Digital Subscriber Line (HDSL) service, which provides 704K bit/sec. access to end users. Pricing will be set case by case, but the company estimates it will cost $75 to $175 per month. Installation will cost $300 to $500.

Davis County School District in Utah is buying 200 of the 704K bit/sec. HDSL lines from US West to replace frame-relay lines that connect 76 sites. Dick Lemon, MIS director of the school district, said he expects to save $80,000 by installing the first 89 lines. He said the district's bill will drop from $196,000 to $106,800 per year.

Also, Pacific Bell plans a limited September deployment of a 1.5M bit/sec. Asymmetric Digital Subscriber Line service for telecommuters. The technology downloads data at 1.5M bit/sec. and uploads it at 384K bit/sec.

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COMPUTERWORLD
Users ask mail vendors: "Can't we all get along?"
Visual Basic, Java vie for 'net crown
Jim Tuominen decided the only way to deal with growing user expectations of the Web was to seize the initiative and set some rules.
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The Internet

The World Wide Web ♦ Intranets ♦ Online Services

Briefs

CLICK TO DIAL

Estimated number of users of Internet telephony

1996	2 million
1999	16 million

Source: Forrester Research, Inc., Cambridge, Mass.

Banyan upgrades mail

The Coordinate.com division of Banyan Systems, Inc. in Waltham, Mass., this week will announce BeyondMail Professional 3.0, an upgrade of its mail client software that can be configured to automatically manage incoming and outgoing mail. The Post Office Protocol 3-compliant mail client costs $69 per user and is available now.

Real-time video

Progressive Networks last week announced RealVideo, a real-time video application designed to run over the Internet at any common connection speed, ranging from a 28.8K bit/sec. modem connection to a high-speed LAN.

Progressive Networks makes RealAudio, by far the most popular application for real-time audio 'net feeds. The beta version of the video server starts at $295. The beta version of the client, or "player," software is available for free at www.real.com. The final version of both products will be available by June.

Customized sites

Firefly Networks, Inc. next month plans to introduce a product to let users build Web sites that customize themselves automatically to suit user preferences.

A demonstration that runs at the company's site guesses users' movie and music preferences and matches Shakespeare buffs from around the world.

But the same technology, which doesn't have a brand name yet, could be used on an intranet to match users across continents with similar job responsibilities and complementary talents, thus helping them work together as teams, Firefly officials said.

Digitally certified

STELLA JOHNSON

▸ *Investment site rejects passwords*

By Mitch Wagner
BOSTON

WHEN Liberty Financial Cos. launched its investment Web site last month, it rejected traditional security approaches in favor of digital certificates, a much-ballyhooed but seldom-implemented technology.

The company, which controls $47 billion in assets, launched the site for its Stein Roe & Farnham, Inc. consumer investments business unit and its Keyport Life Insurance Co. unit, which serves investment sales representatives. The sites provide custom views of financial data and investment options based on user profiles.

The company picked digital certificates over traditional password-based access because pass-

Certificates, page 60

ELECTRONIC COMMERCE

'net not ideal for selling insurance, survey finds

By Thomas Hoffman

YOU MIGHT BUY a book or a compact disc over the Internet. But life insurance?

Life insurance products are more often sold by agents than shopped for by consumers. As such, "push" products such as life insurance lend themselves more to face-to-face salesmanship than online script.

"The only time I bought life insurance was when I was threatened into it," said John Alexander, former chief information officer at insurer Unum Corp. in Portland, Maine, and now president of Business Technology Consulting, Inc., also in Portland.

That attitude is pretty common, according to a recent survey by Computer Sciences Corp. (CSC) in El Segundo, Calif. According to the poll, only 1% of consumers prefer to purchase life insurance over the Internet (see chart). "When looking for life insurance, most people don't know what they want," said Karen Steinberg, director of CSC's Insurance Center of Excellence in Syracuse, N.Y., which conducted the study of 1,001 consumers with Centrac, Inc., a survey company in Fairfield, N.J.

During the past year, companies such as American International Group in New York that

Insurance, page 61

Technology profile of life insurance consumers

Own a PC	49%
Use the Internet	23%
Use computers to pay bills	7%
Have purchased something over the Internet	4%
Would purchase life insurance over the Internet	1%

Base: 1,001 consumers surveyed nationwide

Source: Computer Sciences Corp.'s Insurance Center of Excellence, Syracuse, N.Y., and Centrac, Inc., Fairfield, N.J.

If study proves true, Navigator is set for a fall

By Justin Hibbard

A NEW MARKET study suggests companies might want to think twice about optimizing their World Wide Web sites for Netscape Communications Corp.'s Navigator browser.

But the study's methodology suggests companies might want to think twice about heeding market studies.

"The 1997 Netscape Report," released last week by Jupiter Communications, Inc. in New York, found that 59% of consumers on the Web use Navigator. But that number will drop to 38% by the end of the year, according to the study. The report also found that 21% of consumers use Microsoft Corp.'s Internet Explorer browser and that its market share will rise to 42% by the end of the year.

The percentages are based on numbers from Web sites that post records showing which browsers request their pages, according to Ross Rubin, an analyst at Jupiter. Jupiter researchers adjusted the numbers according to the percentage of

Browsers, page 61

Snapshot

OUTSOURCING IS IN

Many companies currently have external Web hosts...

Base: 51 Fortune 1,000 companies

...and they have their reasons for doing so. The most important criteria in choosing a hosting firm are:

Base: 35 Fortune 1,000 companies, multiple responses allowed

Source: Forrester Research, Inc., Cambridge, Mass.

Certificates

CONTINUED FROM PAGE 59

word protection isn't secure enough, said Iang Jeon, vice president of electronic commerce. Security experts estimate that when many accounts are involved, roughly 10% of password-protected accounts can be cracked relatively easily by hackers simply trying to guess the password.

"If you have a simple password, it's easy to crack," Jeon said. "We wanted to make sure our site was tougher than that."

MANY USES

Digital certificates also are easier to use and more flexible than passwords. Users have to remember passwords, but software automatically manages and authenticates digital signatures. Also, digital certificates can be adapted for use in other applications aside from simply logging on to a site, Jeon said.

Liberty Financial may use digital certificates in contracts that would be as legally binding as hard-copy agreements, Jeon said. Also possible are digital credit-card payments and transaction confirmations. The digital certificates also could be expanded to include electronic-mail communications and the World Wide Web.

David Weisman, an analyst at Forrester Research, Inc. in Cambridge, Mass., said he is impressed by the innovation at the Liberty Financial site. But he warned that the strategy could be risky, as is any pioneering application of technology.

"They're pushing the envelope," he said. "Issuing certificates is new stuff. Being first is dangerous." Keeping track of the certificates and confidential information will require large databases of information and transaction processing and could be subject to slowdowns and breakdowns.

The customization and encryption features at the Liberty Financial site will give the company a strong competitive advantage, said analyst Patricia Seybold, president of Patricia Seybold Group in Boston. "Everybody's talking about it, but I don't think anyone else has done it," she said.

Liberty Financial uses digital certificate technology from BBN Corp. in Cambridge, Mass. The SafeKeyper technology uses public-key encryption, an advanced form of encryption designed to provide greater levels of security and flexibility than conventional, or single-key, encryption methods.

Liberty Financial issues the digital certificates by using public-key encryption to encrypt a tiny data file and then storing the file on a user's hard drive. When users visit the site using a browser enabled to handle BBN's version of the digital certificate, they are authenticated automatically. The only browser that currently supports SafeKeyper is Netscape Communications Corp.'s Navigator, although Microsoft Corp.'s Internet Explorer support is expected to support it in the future.

NEW PRODUCTS

MACROMEDIA, INC. has announced Flash, software for World Wide Web publishing.

According to the San Francisco company, Flash makes it easier to create small, fast Shockwave animations and other multimedia. A set of drawing tools, animation controls and other designer aids are included. A Flash player is only 100K bytes and provides quick downloads for users with 28.8K bit/sec. modems.

Flash costs $249.

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UNIDATA, INC. has announced Unidata RedBack, a database management system-independent tool kit for building transactional applications for the Web and corporate intranets.

According to the Denver company, users need a standard Web browser to access RedBack applications. Client application components are exported automatically to a user's desktop.

Unidata RedBack costs $3,495.

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SIEMENS

If we built a $36 million telecommunications network in the Russian

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Insurance isn't selling on 'net

CONTINUED FROM PAGE 59

have been trying to sell life insurance over the World Wide Web through services such as Quickquote.com have found that it is tough to sell online. That is because life insurance products are generally too complicated for consumers to understand, Steinberg said.

Because Internet surfers have short attention spans, life insurance — in addition to other products with limited sex appeal or a long sales cycle — will have to be super-simplified before it can be pitched online, he said.

Besides, life insurance policies have to be underwritten by agents and require a medical exam and blood testing. So even if consumers use the 'net to compare insurance rates, they must do additional legwork to get a policy. "It's not a simple transaction," Steinberg said.

It doesn't help that life insurance product sales are flat nationwide. Sales of group and individual products slipped 3.4% from 1994 to 1995, according to the American Council of Life Insurance in Washington.

DOUBLE INDEMNITY

Nevertheless, the Internet provides a glimmer of hope to life insurers. The CSC study found that the biggest growth area for life insurance is in the workplace.

There, insurers can use the Internet to generate and accept employee applications online. Also, the 'net is a less expensive conduit for insurers to communicate with agents and customers than 800 telephone numbers and leased-line networks, said Jean C. Gora, manager of research at the Life Office Management Association, an Atlanta-based financial services educational organization that has 800 members.

Browser study questioned

CONTINUED FROM PAGE 59

home users the researchers believed had accessed the sites, Rubin said. The researchers also based their findings on informal interviews with CEOs at Internet software companies.

Clay Ryder, an analyst at Zona Research, Inc. in Redwood City, Calif., questioned Jupiter's methods. Zona Research is an indirect competitor of Jupiter's.

"It doesn't sit really well with me because they're just looking at log files, and there are lots of ways those can be manipulated," Ryder said.

He said it is unlikely that Navigator's share among consumers will fall as low as 38% by the end of the year. Moreover, business users outnumber home users on the Web, according to Ryder. Zona Research last month surveyed 211 information systems managers, and 70% said Navigator was the primary browser at their sites.

ADEQUATE COMPENSATION?

Rubin acknowledged that logs from individual Web servers present an incomplete picture of the entire Web. But he maintained that Jupiter compensated for each site's idiosyncrasies.

"We tried to take into account the biases of users accessing the sites, and we also tried to correct for them," Rubin said.

Companies that develop Web sites aimed at consumers were largely unfazed by the report.

"We author our [Web pages] in a way that separates our content from the presentation," said Shadrach Todd, a developer at Time, Inc.'s Pathfinder site.

Todd said Pathfinder deals with incompatible browsers by using page templates designed for different browsers and automatically filling them with the same text and graphics. The company also is evaluating various database publishing schemes to further reduce redundant authoring.

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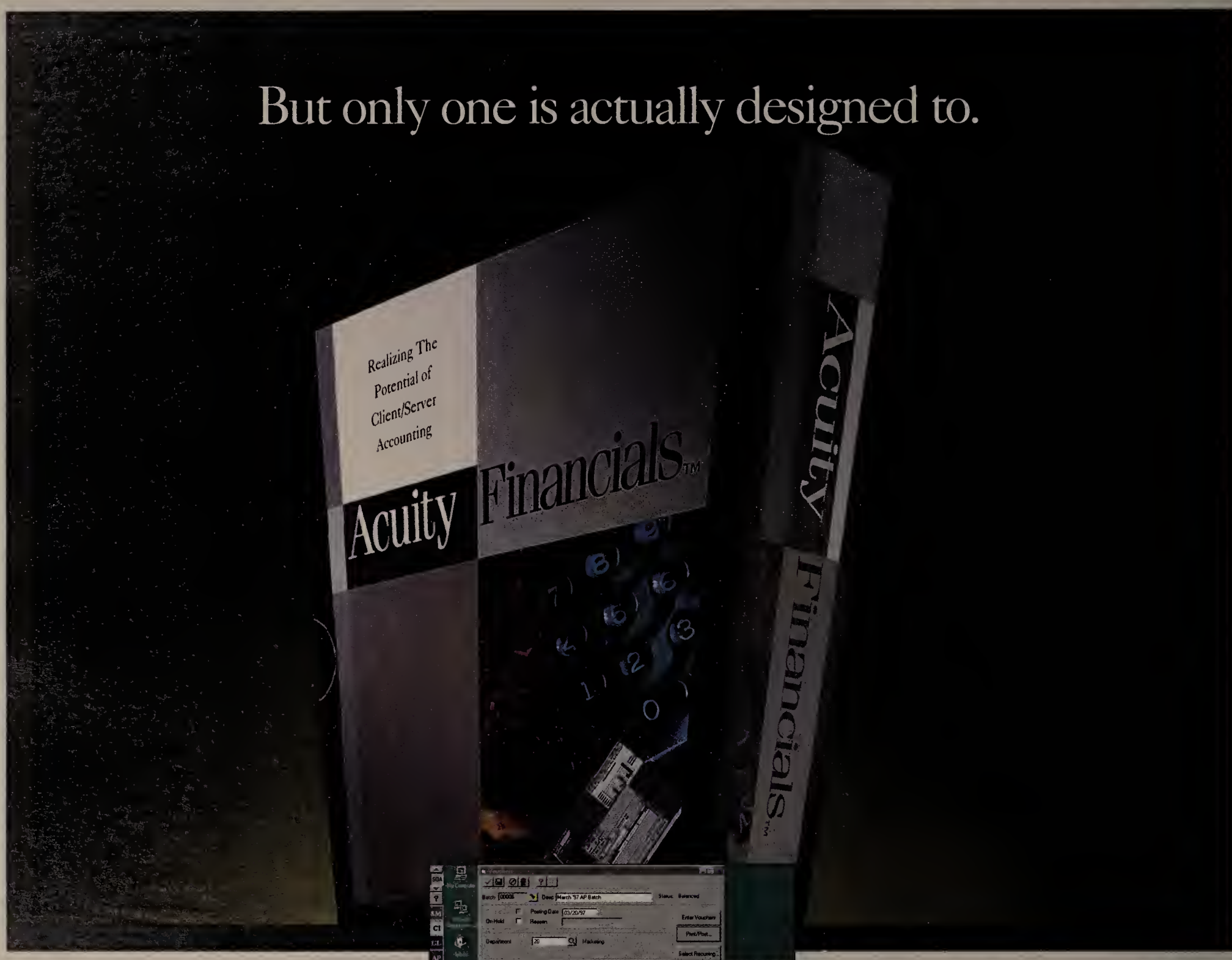

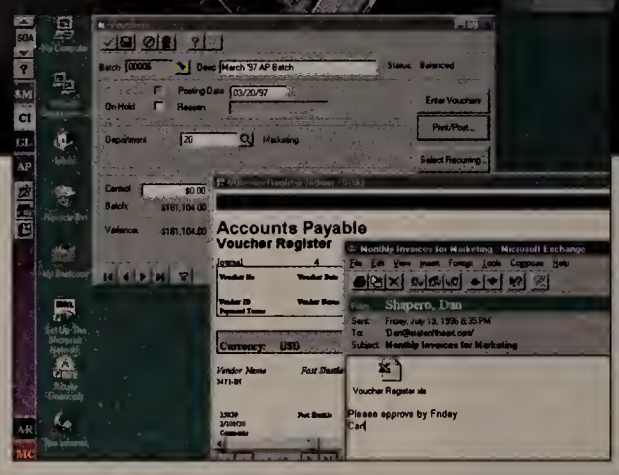

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Corporate Strategies

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Briefs

Year 2000 price tag

It will cost the federal government $2.3 billion to get its computer systems year 2000-compliant, according to a report by the U.S. Office of Management and Budget (OMB). The Information Technology Association of America (ITAA) lauded the OMB for acknowledging the seriousness of the problem but took issue with the conclusions. "Outside experts have estimated the government conversion costs at closer to $30 billion," said ITAA President Harris Miller.

AMS to advise utilities

American Management Systems, Inc. (AMS) in Fairfax, Va., has formed an electric and gas utilities practice to provide technology consulting, systems integration and specialized application services to companies entering a deregulated energy market. AMS services include support for billing, customer information management systems and energy brokerage.

Unisys wins LAN deal

The U.S. Social Security Administration has awarded Unisys Corp. a $14.9 million LAN services contract. The five-year deal covers support and maintenance services for the agency's 452 Token Ring LANs, an Ethernet LAN and other systems.

Square D to fix code

Square D Co., a Palatine, Ill., electrical equipment manufacturer, has hired Computer Horizons Corp. in Mountain Lakes, N.J., to make its 20 million lines of application code year 2000-compliant by the end of next year. Financial terms weren't disclosed.

Wise hires Think

Wise Foods, Inc. in Berwick, Pa., maker of Cheez Doodles and other snack foods, has licensed Parsippany, N.J.-based Think Systems Corp.'s FYI Sales application software and online analytical processing technology for sales forecasting, analysis, budgeting and presentations.

Micron's internship program*

	Number of interns	Interns hired as employees
1996	63	To be determined
1995	59	30
1994	18	6
1993	23	6
1992	18	3
1991	22	11

* Interns in all departments, including IS

Companies use interns as hiring pool

By Julia King

LOOK AROUND your information systems group this summer and don't be surprised to see more than a few baby faces.

More companies are recruiting high school and college interns, banking that the students will sign on after graduation as much-needed full-time IS professionals.

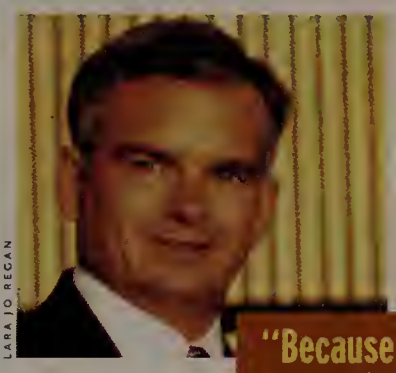
Payoffs for employers include

Interns, page 65

• If a platform migration doesn't work . . .

Steel firm reboots enterprise apps

By Jaikumar Vijayan



LARA JO REGAN

IT HAS TAKEN Earle M. Jorgensen Co. two platform migrations in two years to get the performance boost and platform flexibility it was looking for.

The metals distribution company's first migration, prompted by a merger, sought to consolidate critical data-center applications that resided on different systems into a common platform.

The new system failed to deliver the desired performance and lacked the scalability to grow. So Earle M. Jorgensen (EMJ) did a second migration — and learned, like many other companies, the importance of leaving enough hardware "headroom" to support future application growth.

DRASTIC IMPROVEMENTS

Having spent nearly $2.6 million so far in hardware conversion costs alone, EMJ is seeing drastic improvements in application performance, customer response time and platform scalability. For example, EMJ's end users can do, on average, three or more queries on the company's 50,000-item inventory system in the time it once took to do one, saving time and money.

"But because we relied so much on our software vendor's data and recommendation for hardware sizing, [the first time,] we ended up spending a lot more to get these gains," said Mark McWhirter, vice president of information technology at EMJ.

"Because we relied so much on our software vendor . . . we ended up spending a lot more to get these gains."
– Mark McWhirter, Earle M. Jorgensen Co.

The $1 billion EMJ, based in Brea, Calif., is one of the largest independently owned metals distributors in the U.S. It was formed in 1990 from the merger of Jorgensen Steel and Aluminum with Kilsby-Roberts Co. — two metals distributors that were each more than 80 years old.

The company processes and distributes preproduction steel, aluminum, specialty tubing, pipe and bar products to more than 50,000 customers internationally.

The merger meant consolidating the companies' applications into a common hardware and software base. The different business applications that ran on old IBM and VAX minicomputers were converted to a customized WorldWide Information Network (WIN) system developed by an outside software vendor. The chosen hardware platform was a VAX cluster.

Migration, page 65

Overhaul helps Chicago printer

By Randy Weston
CHICAGO

TWO YEARS AGO, executives at Uarco, Inc., a $550 million company that prints purchase orders and other business documents, discovered an expensive bit of irony — they were doing very little to manage their own orders.

In fact, order fulfillment was Uarco's most expensive business process, said Steve Balow, senior vice president of technology at the Barrington, Ill., company. "We identified $100 million in costs attributed to order fulfillment," he said.

So Uarco started a complete technology overhaul project that included installing The Baan Co.'s client/server application

Overhaul, page 64

JEFF SCIORTINO

"We were seriously constrained by technology and our application system."
– STEVE BALOW (center), UARCO, INC.

Canadian bank uses multimedia to train employees

By Tim Grantham
TORONTO

THE ROYAL BANK Financial Group, Canada's largest financial services company, is using distributed database technology to provide just-in-time training to employees at more than 50 branches across Canada.

By next year, the bank expects to expand its $1.47 million pilot system started last summer, called the Personal Learning Network (PLN), to more than 1,000 branches.

PLN lets bank employees take charge of their skills development using the multimedia

Bank, page 65

Overhaul boosts Uarco profits

CONTINUED FROM PAGE 63

package and Lotus Development Corp.'s Notes 4.1. The two were then linked so that the business processes supported by the Baan 3.1 application package were fed into 20 Notes databases, according to Karl Gouverneur, Uarco's director of technical architecture. As part of the $21 million project, Uarco also linked its 14 manufacturing and call service centers across the nation to a single network.

The investment increased the company's net profits by $25 million, Uarco officials said. The windfall comes from streamlined business processes.

For example, salespeople now spend four days selling and one day administering orders, instead of the other way around. And service representatives handle customer calls directly instead of having salespeople act as brokers, Balow said.

When Uarco officials analyzed their order management systems, much of the unexpected costs they found resulted from the time it took salespeople and customer service representatives to take orders. Those workers had to comb through a 1,000-page manual to look up each specification the customer wanted and how much it would cost. If a customer changed an order, that would add several more hours. Keeping the manual updated required mailing new pages to the service force.

"Our sales force was spending 60% to 80% of its time administrating orders," Balow said. "They are paid to develop customer solutions, but their week was spent finding out the status of an order or figuring out the pricing structure for an order."

Balow added that Uarco "couldn't really change our business to meet the demands of the marketplace. We were seriously constrained by technology and our application system."

Technology at Uarco during the period was a patchwork of IBM AS/400 systems, 25-year-old Honeywell, Inc. mainframes, isolated PCs and islands of Novell, Inc. LANs. And forget electronic mail — sending a spreadsheet from one office to another required a call to Federal Express Corp. Although the company has kept a few of its AS/400s, Windows NT-based servers from Compaq Computer Corp. support the client/server systems.

COST SAVINGS

Under the new information systems regime, customer service agents now handle price quotes and order fulfillment while salespeople spend their time selling. It used to cost $16 million to provide 213,500 price quotes per year. It now costs $10 million.

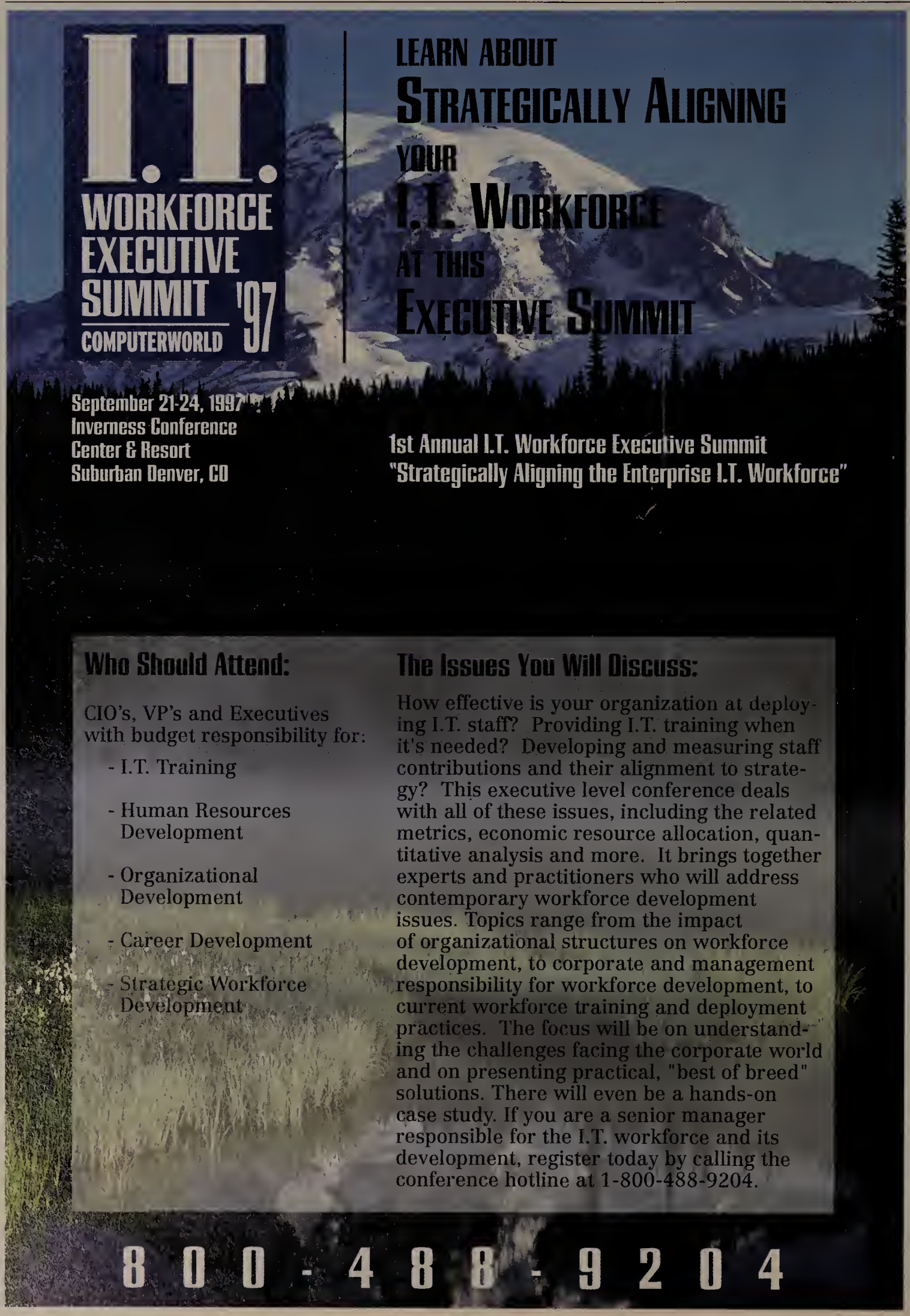
"The goal of business process reengineering is to take a company's resources and redeploy them to maximize your profits," said Clare Gillan, an applications analyst at International Data Corp. in Framingham, Mass. She said that with significant client/server implementations and investments, that goal is realized by freeing up "your higher-paid people to do the front-line jobs" such as selling.

Ruth Redman, a 23-year veteran of Uarco who is in charge of national contracts, said much of her job required training new customer service representatives. It often took several months of one-on-one training to get workers proficient in their jobs, she said.

The new system has simplified the task. New users can now train themselves and answer their own questions by following the procedures displayed in Notes in one window while running the Baan software in another. Redman said it lets her concentrate on her job of keeping large national customers happy.

New recruits "are ready to rock once they have been through their core training," Redman said. "I don't have to get up out of my chair to get the answers they need, so both people remain productive through the training process."

Redman said she can now fill in minutes an order that previously took up to two hours.



Interns get a taste of IS

CONTINUED FROM PAGE 63

firsthand knowledge about the work habits and hands-on experience of employees hired from the programs. Workers with internship experience also require less training and become productive sooner than other employees.

The programs often are key to IS attracting undecided students or students from non-IS disciplines. Students can see the kinds of career opportunities available to them in IS, recruiters said.

Some of the 200 to 300 new IS and engineering staffers hired this year at McDonnell Douglas Aerospace in Huntington Beach, Calif., will have already worked at the company through its summer hiring program for college students.

In 1994, there were 24,000 computer science graduates, down from 42,000 in 1986. Meanwhile, demand increased by about 30%, according to Cap Gemini America.

Up to 50 college students are hired under the McDonnell Douglas program, which resumed last year after a five-year hiatus that coincided with a downturn in the aerospace business.

Exactly how many of these students were hired as full-time employees hasn't been calculated, said Lenore Willoughby, the company's senior manager of staffing and placement.

HELPING HIGH-RISK STUDENTS

The aerospace company also has an employment program for high school students who have a high risk of dropping out before graduation.

Students work on a part-time basis while they remain in school. Gradually, their work responsibilities and exposure to different types of projects are increased to demonstrate the range of opportunities available in engineering and IS, Willoughby said.

So far, two of the five students recruited to the two-year-old program have graduated from high school. One has gone on to a technical school; the other has gone to a junior college to study IS, Willoughby said.

Micron Technology, Inc., a PC and microchip manufacturer in Boise, Idaho, hires two to five IS interns per year.

EXTRA BENEFITS

In addition to receiving a salary, the teenagers and twenty-somethings are put up in corporate housing complete with a swimming pool, clubhouse and maid service. They also are given the same training and work on the same kinds of projects as new, full-time software engineers.

After graduation, about 90% of the IS interns accept full-time positions at a starting salary of about $35,000, said Laurel Naccarato, staffing manager at Micron.

"By then, that person is coming to us with two to three years' experience," Naccarato said.

Mike Magalsky, 23, graduated from Micron's internship program and worked two summers in the company's IS group. He is now a full-time software engineer who primarily works on systems development and maintenance applications.

"When they brought me on, it was quite the experience because I really had very little understanding of programming and computers, and I had absolutely no clue how the world worked outside the classroom," Magalsky said.

"But they put me right in the middle of a group doing real-time data manipulation. I was given responsibilities right off the bat. After that first summer, I knew that I wanted to stay in the computer industry," Magalsky said.

Bank uses multimedia to give employees extra training

CONTINUED FROM PAGE 63

training workstation at their branch.

"PLN is not intended to completely replace our more traditional training resources," said Gail Whittemore, manager of workplace learning at the Toronto-based company. "But it does enable us to significantly expand the opportunities for career development to staff all across the country."

To entice employees — many with little PC experience — to use PLN, its user interface was designed to look and feel like a multimedia CD-ROM. The design includes MPEG video clips that guide users through lessons.

Loretta Simonot, manager of business services at a Royal Bank office in Saskatoon, Saskatchewan, credits the user interface with the continued high usage among her 42-member staff.

Usage remains at 70% seven months after the workstation was installed. "Some staff are even coming in at night and on weekends to use it," Simonot said.

Deborah Wilson, a former manager at a Toronto branch, said her staff liked PLN because members could get training without having to travel in order to attend courses.

"They also liked it because it enabled them to apply the lessons they learned right away in their dealings with customers," she said.

The PLN workstation application comprises a front end created with Powersoft Corp.'s PowerBuilder and Sybase, Inc.'s SQL Anywhere relational database running on the same machine. Each night, the PLN workstation connects to a central PLN database and copies changes in each user's data, such as frequency of usage or courses completed.

The central database also updates the workstation's database with the latest changes in courses, educational resources and career information.

Managers can use the system to track which courses an employee has completed, such as customer service training, for example. It also lets the bank's training managers in Toronto monitor the effectiveness of the courses.

"The Royal Bank's application is definitely advanced," said Christianne Moretti, director of the IT Training and Education research program at International Data Corp. Canada in Toronto.

The recent availability of multimedia training "courseware" and affordable technology will make such learning networks more common, Moretti said.

VMI Communication and Learning Systems, Inc. in Toronto and Chicago managed the project's progress and implemented PLN's database replication functions.

And Visual Systems, Inc. in Toronto designed the workstation front end.

Grantham is a freelance writer in Paris, Ontario.

Migration works the second time

CONTINUED FROM PAGE 63

The new system, implemented fully by early 1995, supported the combined operations of the two companies and offered users a greater level of inventory, sales and marketing information than before.

"But the configuration did not provide enough horsepower to support the number of users and system activity we were generating," McWhirter said.

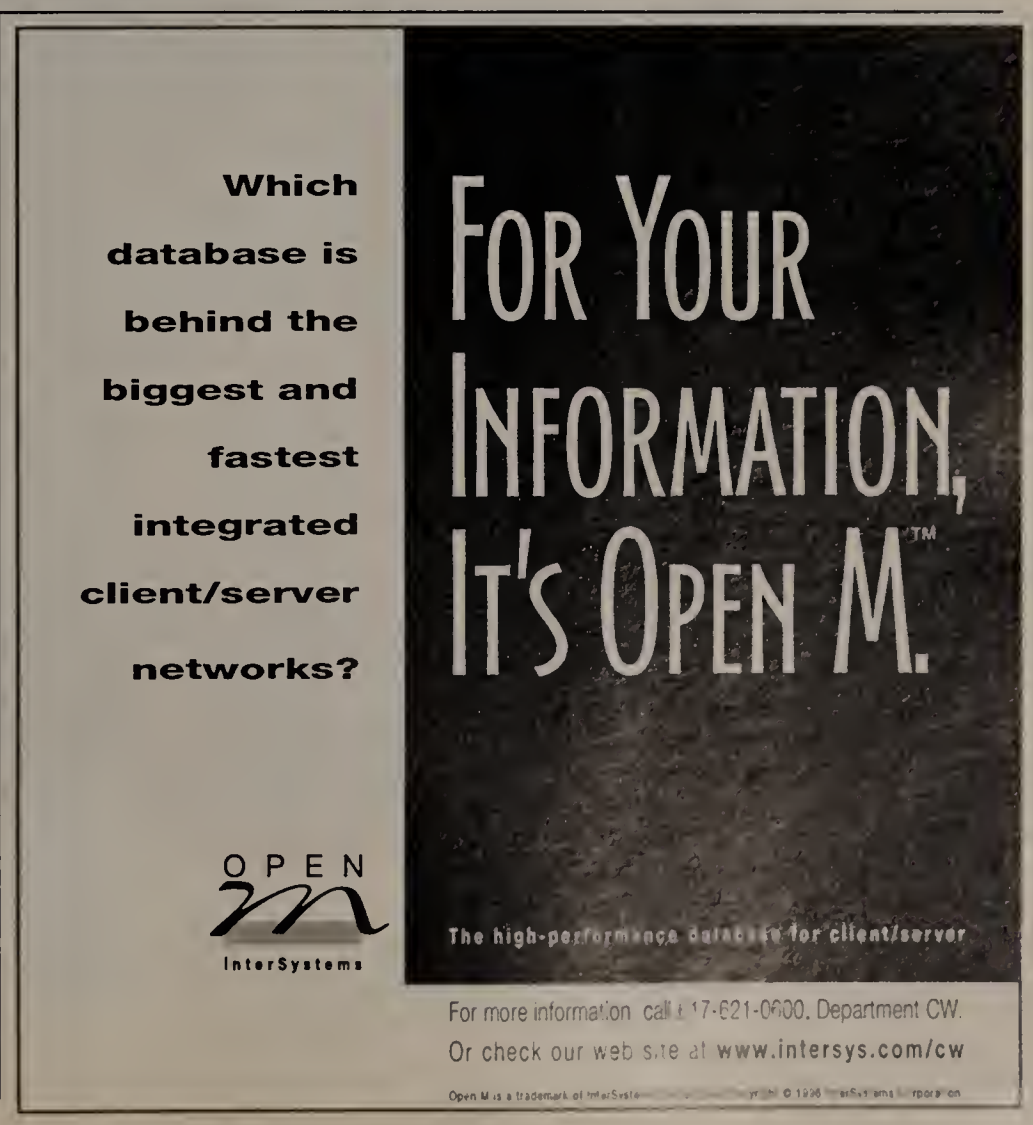
LACK OF EXPERIENCE

"We basically did not have a lot of experience running our new software under [full] load. So we built our configuration based on our software vendor's recommendations," McWhirter said. "In hindsight, it proved to be insufficient for our needs."

As a result, less than a year after the VAX conversion, the company decided to move to an Alpha server platform. The move meant rewriting more than 1 million lines of source code from about 9,000 programs so the VAX-based WIN program could run on the new Alpha servers.

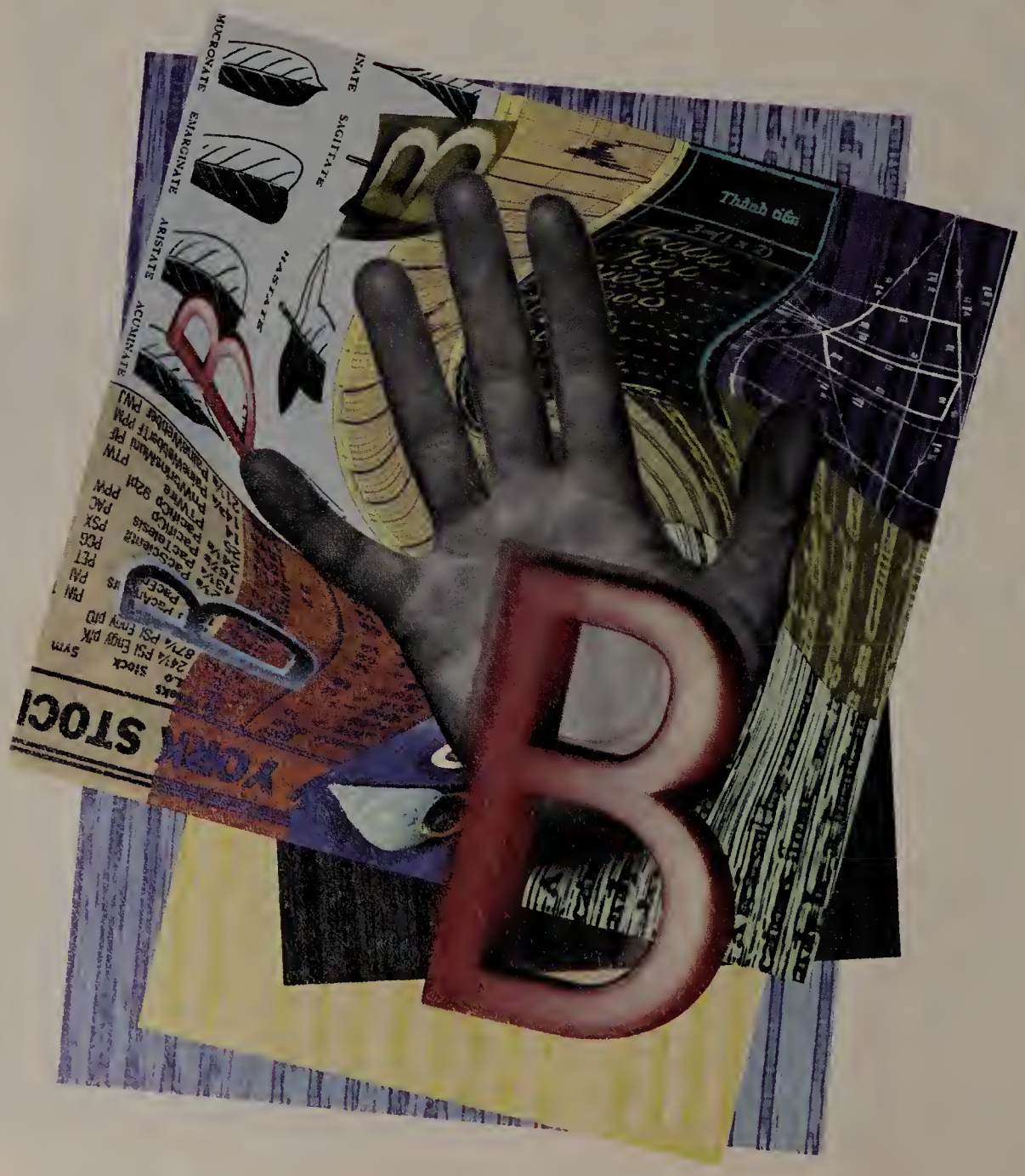
EMJ this time used simulation software to mimic actual application usage and did hardware benchmark tests at one of Digital Equipment Corp.'s labs to "prove to ourselves that the configuration and size of the boxes were adequate," McWhirter said.

The company now runs all its core data-center applications on four clustered, dual-processor Alpha 8400 enterprise servers from Digital. Each system is equipped with 4G bytes of memory, and they support a total of 171G bytes of disk space among them.



Managing

WILL 'PUSH' PAN OUT?



MARGARET RIEGEL

'Push' technology could help boost sales, cut costs and make life easier for IS managers. But first, it has to prove itself.

CONTINUED FROM PAGE 1

include the ability to collect information from corporate databases, intranets or the World Wide Web, customize it for users' individual needs and send it to them automatically.

Such a "pushed" message could show up as an on-screen alert, a pop-up window or even as electronic mail or a fax. NationsBank, the Charlotte, N.C., bank holding company, is piloting Wayfarer Communications, Inc.'s Incisa to send corporate news companywide without routing it through multiple E-mail

Trustworthy 'net?
The future success of the Internet isn't based on better technology; it's in building a sense of trust among consumers, Peter Keen says. Page 70

systems. NetworkMCI is beta-testing Verity, Inc.'s IntelliServ to pluck information about competitors from a torrent of internal and external data and speed it to recipients who need it.

Push technology promises to eliminate many weaknesses that plague today's Web products. Typically, a user "pulls" complete Hypertext Markup Language pages to a Web browser from an external Web server or an intranet. That not only consumes a lot of network bandwidth, but it can require the user to do a time-wasting search for information. Power users could use pull tools to hunt for information, but they can drag back bad data or viruses along with usable data.

Push software, on the other hand, creates a central location on a server that gathers information, matches it to each user's needs and automatically sends it to the user as needed.

PointCast, Inc.'s namesake software, an early example of push technology, allowed users to choose the Web sites from which to draw updates, but it irked IS because it required a bandwidth-hogging permanent Internet connection to get the updates. (PointCast now offers an inside-the-firewall server to cache requests and replies and give IS more control over the information flow.)

BETTER CUSTOMER SERVICE

Push technology could help companies improve customer service by quickly alerting workers to emergencies or problems. At Detroit Edison Co., webmaster Ed Boyd hopes Incisa can replace voice mail or E-mail to send weather updates to utility employees who must work extra hours during storms. Unlike those other methods, which employees can claim they didn't check, "I know [the Incisa notice will have] popped up on your desktop," he says.

Incisa also eases a bandwidth strain caused by PointCast that had slowed Web access for employees. "Previously, we had something like 45 machines [that] would attempt to broadcast at the same time through the proxy server" to reach the PointCast service, Boyd says. With Incisa, "we have just one point of exit through the proxy server to pull in" information that will later be pushed to users. And Boyd says managing the system "doesn't look like it's going to [be] anything that will be totally unmanageable or unwieldy."

At NetworkMCI, "if you miss information, you lose business," Soltis says. His group has spent the past several years looking at a range of push products to find information about potential clients and speed the information to the right salespeople.

To find that information now, users at the communications software and services company must search through the intranet web site. Soltis is very bullish on push technology but admits the existing products "are extremely immature. You need to do a great deal of programming to integrate [them] either with the Web or with E-mail." A shortage of network bandwidth and network management tools is restricting most push solutions to relatively small text transmissions rather than video or animation, he says. But as customers expand their bandwidth and vendors improve network management tools, "I definitely do not think [bandwidth] will be a long-term concern."

LOOKING AT THE BACK END

Another way to improve customer service and increase productivity is to use push software as a front end to legacy databases and outside information. Some push vendors are responding with powerful back-end tools that link their "push" servers to legacy databases. Mosaix, Inc., a Redmond, Wash., systems integrator and software developer for call centers, hopes to do that with Channel Manager from DataChannel Corp. in Bellevue, Wash.

Mosaix currently uses client/server development tools such as Powersoft's PowerBuilder and Microsoft Corp.'s Visual Basic to build the screens seen by call-center employees, says Brian Moore, executive director of professional services. "Our developers are very encouraged by the prototype tools" from DataChannel, he says. The tools would allow them to customize what end users see on their screens at a central server rather than having to tweak and redistribute the client portion of the software on each user's PC.

THE BIG QUESTIONS

It remains to be seen whether push technology can grow up to distribute large amounts of data or software to thousands of users without overloading networks. Also left unanswered is how hard it will be for IS to manage the push servers and whether business and IS managers can create manageable, coherent flows of information that actually help their businesses make more money.

Incisa makes "very, very efficient" use of bandwidth by pushing small amounts of text to fewer than 100 workstations in a pilot, says Mitch Hadley, a vice president in NationsBank's strategic technology group. "But if we were to drop in a message to a thousand, two thousand, three thousand people, we

Will push pan out, page 68

THE LOWDOWN ON 'PUSH'

WHAT IT IS: Unlike when a user pulls information to his or her PC with a Web browser, push software collects information and automatically sends it. Some push products can also distribute software updates, Java applets or uniform resource locators that guide users to Web sites.

POSSIBLE USES: Increase sales opportunities by collecting leads and distributing them to the proper sales representatives. Improve telephone service by collecting and distributing customer information to employees at call centers. Reduce cost of application deployment by automatically distributing software updates to users' PCs.

POSSIBLE BENEFITS: Ability to customize information sent to users. Automate delivery of crucial news to users. Cost-effective alternative to E-mail, voice mail or paper. Uses low-cost, relatively open Web protocols. Centralizes and eases control of information at server, rather than at users' PCs.

POSSIBLE RISKS: Immature technology that may not work well with larger amounts of data or more users. Lack of administration and development tools. Pushing too much data at peak times or improper network configuration may still clog networks. May add to information overload rather than ease it.

PULL TECHNOLOGY (How the Web works today): A user with a Web browser "pulls" information, usually in the form of Hypertext Markup Language pages, to his or her PC from a Web server. The client software is cheap and easy to get. But users have limited customization abilities and can waste time looking over search engine results.

EXAMPLES OF 'PUSH'

Push technology promises to nudge the information you need right to your desktop. NationsBank is considering using Incisa, from Wayfarer Communications, to alert employees to new financial products they could sell. Ben & Jerry's Homemade, Inc. may use it to speed ice cream inventory updates to users.

WILL 'PUSH' PAN OUT?

CONTINUED FROM PAGE 67

don't know what kind of impact it would have" on the network, he says.

Then there's the question of whether IS, which already manages mail servers, Web servers, Notes servers and application servers, will also have to manage the servers that maintain lists of user profiles and dispatch software agents into the Web. Some early users say push technology could help IS managers better monitor the quality of data users receive.

With earlier pull technology, users could download a company form or procedure manual from a conventional intranet site, cut and paste it into a local file and keep using it even after it becomes outdated. But with push software, the most recent copy could be maintained at the server and sent automatically to users when they need it.

A lack of automated tools makes it expensive to monitor and filter the flood of information coming into NetworkMCI at rates of up to 12 stories per second, Soltis says. But, he says, vendors and IS managers will learn to overcome such problems because the advantages of push far outweigh the drawbacks.

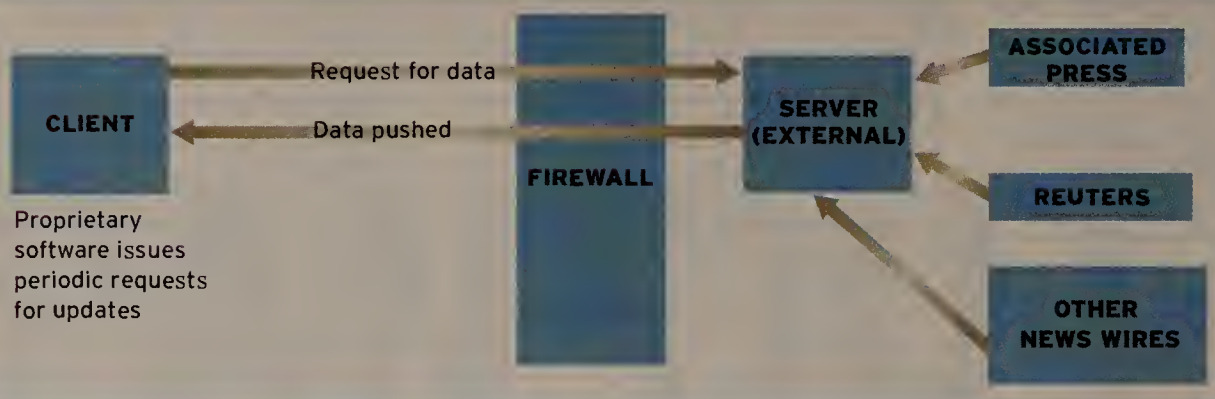
After all, finding information on today's World Wide Web is like "drinking from a fire hose," he says.

With a properly used push tool, "you cut the fire hose down to a nice glass of cold water," Soltis says.

Scheier is Computerworld*'s senior editor, management.*

HOW 'PUSH' WORKS

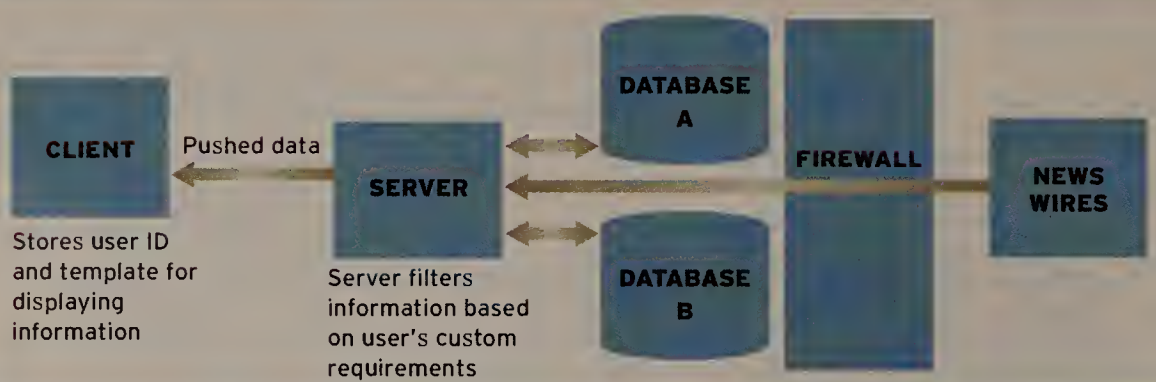
BLANKET PUSH



PROS:
- Client software is free
- Good for updates from outside news feeds

CONS:
- Need for constant Internet connection hogs network bandwidth
- Ads may clutter users' desktops
- Limited customization of data sent to clients
- Can't send internal data to users

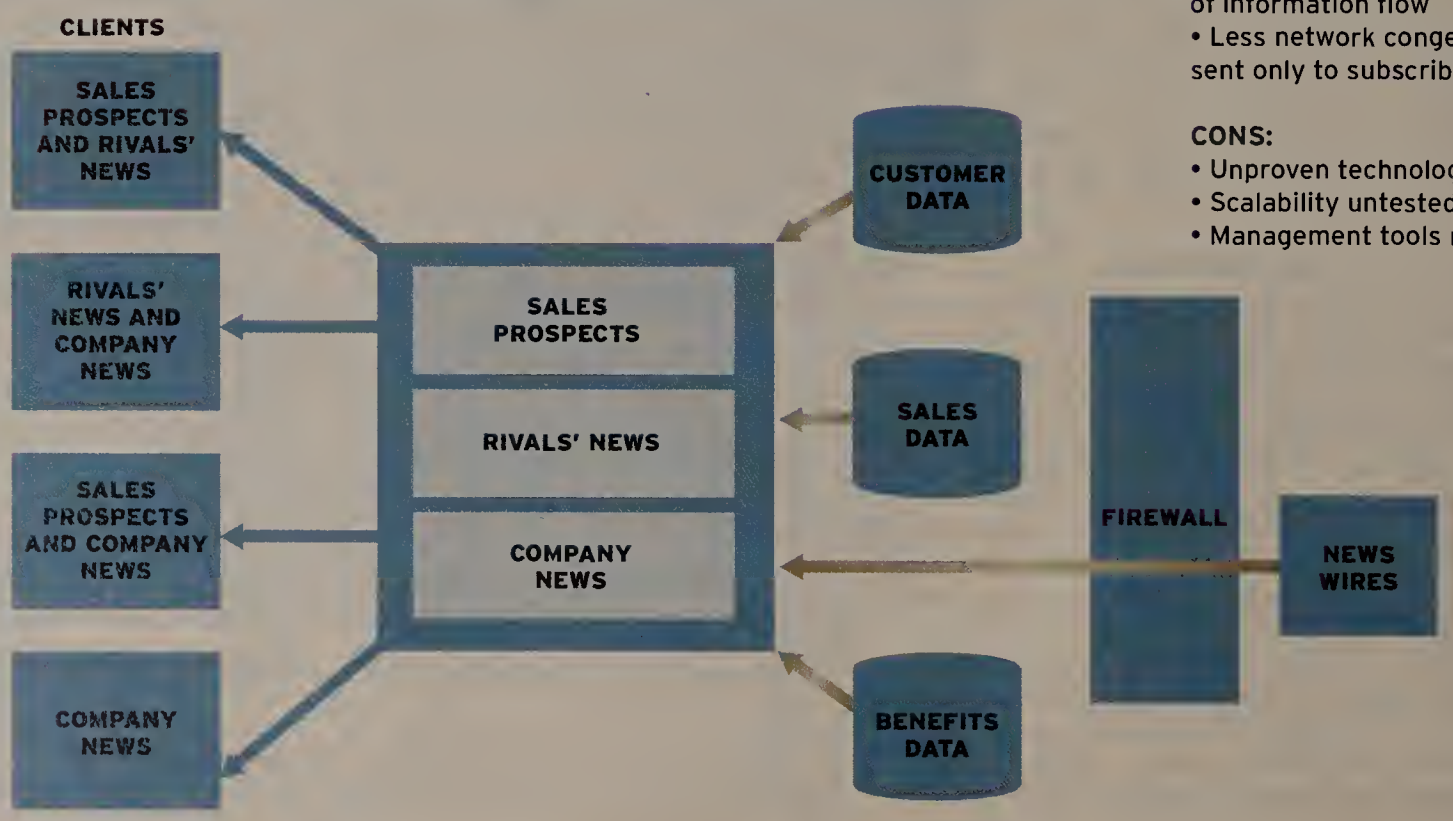
FILTERED PUSH



PROS:
- Users and administrators can customize data sent to users
- Less network bandwidth required because only updates are sent over network
- Can send internal and external data to users

CONS:
- More administration required at server
- Management tools not yet available
- Scalability untested

PUBLISH AND SUBSCRIBE



PROS:
- Users and administrators share management of information flow
- Less network congestion because updates are sent only to subscribers

CONS:
- Unproven technology
- Scalability untested
- Management tools not yet available

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PETER G. W. KEEN

FUTURE OF THE INTERNET RELIES ON TRUST

Asked why he risked his life to climb Mount Everest, a mountaineer answered, "Because it's there." Substitute the Internet for Everest and you get "Our company is on the Internet because it's there." Like Everest, it can't be ignored. It's the biggest in the world. And so on.

What exactly, is the Internet, though, from a business perspective? The "because it's there" approach isn't a business model. Nor is size a reliable base for strategy, as many companies that raced to reach China's billion consumers have discovered.

The Internet's size defines the potential scale of the opportunity, but not the nature of the opportunity. My own opinion (and it's only that; no one "knows" where the 'net is taking business) is that the fundamental opportunity provided by the Internet is the elimination of limitations on electronic relationships. But the Internet also has a constraint: This may be the Information Age, but the Internet doesn't exist in an information economy. It exists in a trust economy.

Electronic relationships have, to date, been limited by one technology factor: the need for the computer at each end of the relationship link to know something about the one at the other end.

TCP/IP enables any type of system to link to any other system. That opens up the three dimensions of business relationships: transaction, information and interaction. The transaction relationship enables the routine buying of goods and services. The information relationship ranges from static displays to highly dynamic simulation. The interaction relationship ranges from passive communication via one-way electronic mail, to active two-way flows and collaboration.

It seems increasingly clear that business success on the 'net rests on designing the electronic relationship along all three dimensions at the same time. Take bookstore Amazon.com. Many other booksellers accept orders online. Many offer catalogs. There are plenty of literary discussion groups. It's a combination of transactions, information and interaction that seems to underline Amazon's sustained growth. You can buy books and search its information base. You can post book reviews, read other readers' reviews, automatically receive E-mail about an author's new books and so on.

My own sense is that just focusing on one of the three dimensions isn't enough. Transactions alone — the standard "mall" approach — are a commodity list to browse through to get the best price. Information isn't by itself a relationship, any more than reading a newspaper is. E-mail and chat groups are communication relationships, but not business ones.

The base for a business model for the Internet is, then, the design of relationships: the combination of attractive transactions, value-adding information and appropriate degree of interaction. But because the Internet's business model is based on relationships, it must also be based on trust mechanisms. Trust, not technological limitations such as compatibility problems, is what will constrain business on the Internet.

Trust is what the question of Internet security is really about: trust in contracting, payments, privacy and safety. Safety is more than security; it's also, in part, psychology. The 'net is more secure for credit-card transactions than are restaurants or telephones, but consumers don't feel safe. They don't trust the 'net.

IS needs to plan for a trust economy rather than information economy and design Internet relationships, not just applications. IS managers need to think differently to design successful Internet-based business applications and consider the following questions:

- Where, in a world where there are no technical restraints on creating business relationships, do we want to build relationships?
- What is the primary nature of the relationship?
- If the primary relationship is, say, transactions, what information and interaction relationships will extend or sustain it?
- What's the basis for trust and safety?

These are questions that IS needs to start asking and businesspeople need to start answering.

Depending on the month, Keen is an author, consultant, public speaker or professor in Great Falls, Va. His E-mail address is pgwk@aol.com.

f.y.i.

EXECUTIVE TRACK

John A. Stone has been named the first vice president of technology and chief technology officer at Bowne & Co., a New York printing company. He was formerly a client partner at AT&T Solutions.

Fred C. Mayer was named vice president of information systems and technology at Herff Jones, Inc. in Indianapolis, a leading manufacturer of recognition awards, educational and graduation-related products.

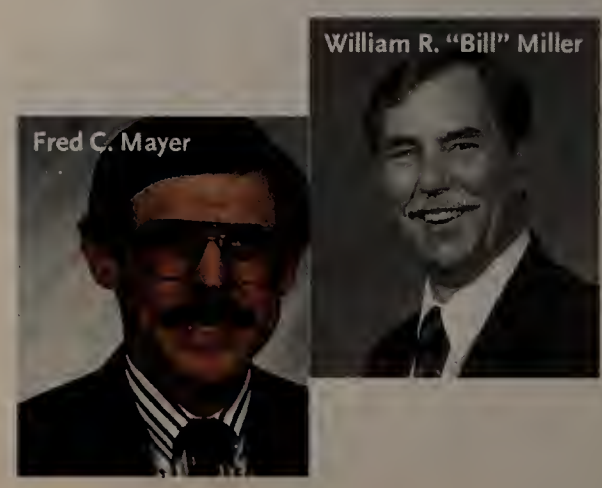
Johanna K. Lieblein was named vice president and chief information officer at the Motion Picture & Television Fund, a service organization that provides social and charitable services on behalf of Southern California's entertainment community.

Edward D. Horowitz was named executive vice president of advanced development for new products and services at Citicorp. Horowitz, 49, moves over from Viacom, Inc., where he was CEO of Viacom Interactive Media.

William R. "Bill" Miller was named vice president of information technology at Sheldahl, Inc. in Northfield, Minn. He was previously corporate IT director at Sheldahl, which makes materials for automotive electronics and data communications.

John R. Gilmer was named executive vice president and chief operating officer at Instill Corp. in Palo Alto, Calif. He was previously vice president and CIO at Sybase, Inc.

Michael J. Randall was named chief technical officer at Cincinnati Bell Information Systems, Inc. Randall, a former vice president for IS at Marion Merrell Dow Pharmaceuticals, was most recently vice president of corporate operations systems at Compaq Computer Corp.



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STANDARD FEATURE COMPARISON	
ALR Revolution 6X6	**Compaq Proliant 5000**
Supports 6 Pentium Pro Processors	**NO**
Expandable to 18 Hot-swappable Drives	NO
Touchscreen LCD Diagnostics Control Panel	NO
InforManager with ActiveCPR	NO
N+1 Redundant/Hot Pluggable 1050W Power Supply System	NO
5 Year/36 Month Limited Warranty	NO
$14,995[1] Manufacturer Suggested Retail Price	**$15,494**[2] Est. Street Price. Based on IDC pricing 1Q97

Pricing and comparison based on these models- [1] ALR Revolution 6X6 Model 1-128 200/512, [2] Compaq Proliant 5000 6/200 Model 1X
Contact ALR for complete comparison information

Because down-time is just not an option...

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12 integrated sensors constantly monitor vital aspects of processor operation. Out of spec readings trigger Central Processor Recovery procedures.

Server watchdog automatically reboots OS in the event of a software crash.

ActiveCPR
1) warns network users of impending shutdown
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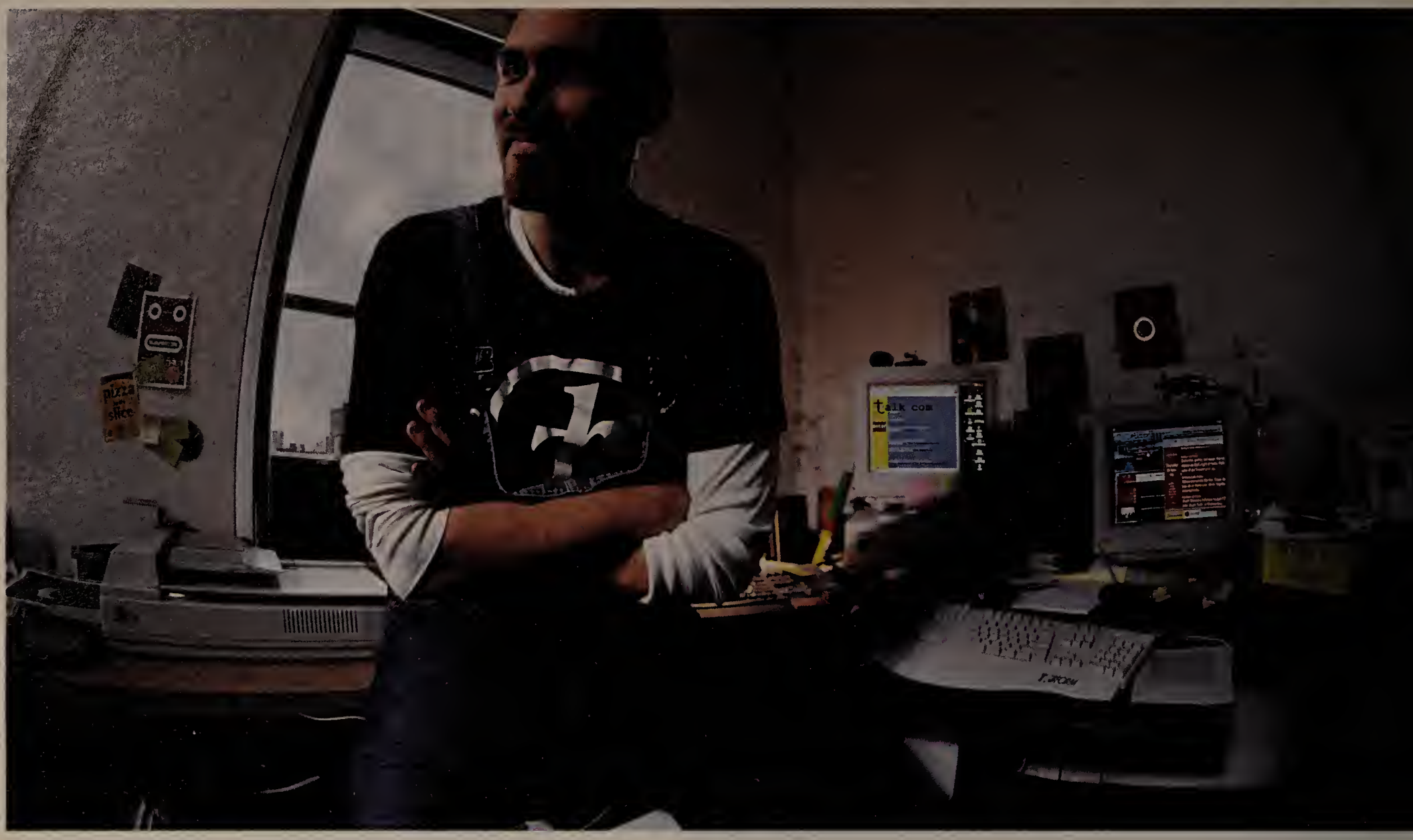

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Buyer's Guide

RAID STORAGE: Greater capacity for lower cost is the theme in the open systems RAID market, although vendors still aren't moving fast enough to keep users happy

THE RAID

BUYER'S ADVISORY: A LOOK AHEAD

By James M. Connolly

Take 32 of today's new 9G-byte disk drives, pack them into a RAID device, and you get roughly 288G bytes of storage. What do you do with all this storage?

Assuming you count every byte as usable storage, you could translate that into a 2,213-foot stack of *Webster's New World Dictionaries*. It could represent about 2,000 copies of Microsoft Corp.'s Office 97 (OK, Office is a little chubby). And, it matches the capacity of about 57 IBM 3380 disk drives — the typical top-end mainframe disk drive of a decade ago. Oh, and each megabyte of RAID storage might cost about one-tenth what you would have paid for a megabyte of yesteryear's 3380 storage.

RAID is getting cheaper and gaining new capabilities, but it still isn't free. Often buyers must set priorities and balance functionality with price, and performance with capacity. To help buyers shop for devices that run with Unix or Windows NT servers, *Computerworld* asked experts for advice about prices, features and performance.

Buyer's advisory, page 74

BUYER'S SATISFACTION SCORECARD

By Kevin Burden

The short lists are set. For open systems RAID servers, information systems managers most often want to buy from a big systems vendor.

Computerworld set out to find how users select Unix RAID systems and how satisfied they are with the products and their vendors. What we found is that users prefer to buy from systems vendors such as Compaq Computer Corp. and Hewlett-Packard Co. rather than RAID-specific vendors such as EMC Corp. and Storage Technology Corp.

What we didn't find was overwhelming praise for Unix RAID. While the majority said they were essentially satisfied, the praise wasn't given with the same passion we saw from mainframe RAID users in last year's survey. Roughly 60% of the mainframe RAID users graded their satisfaction as "very good," and only 40% of Unix RAID users gave this grade.

Users at the 201 sites surveyed lightly criticized the price of open systems RAID and the availability of advanced

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BUYER'S ADVISORY: A LOOK AHEAD

CONTINUED FROM PAGE 73

PRICES

The key factor in determining prices will be the emergence of the 9G-byte, 3.5-in. disk drive as the standard for RAID subsystems. "In the open systems space, prices have been relatively flat for the last six months," says Mike Casey, a research director at Gartner Group, Inc. in Stamford, Conn. "You can buy a box with 20 drives and controllers for about 70 cents per usable megabyte. That's protected storage [Raid Level 5]. But that's based on 4G-byte, 3.5-in hard drives. All the vendors now are announcing 9G-byte, 3.5-in. drives. Within a quarter or two, depending on how they perform in the field, we should see prices come down quite a bit."

Actually, list prices have dipped to as low as 49 cents per megabyte with Sun Microsystems, Inc.'s January announcement of a new RAID line. Other vendors are likely to follow with prices at around 50 cents. But Casey says even lower prices will be available to users who negotiate well.

James Porter, president of Disk/Trend, Inc. in Mountain View, Calif., says prices for complete RAID systems still haven't fallen as fast as basic disk prices because of the "overhead" costs related to a complete system — parts such as the frame, connectors and logic chips. But he says he expects even that to change after a coming market shakeout removes some smaller vendors. Then larger vendors will realize cost efficiencies from volume production, he says.

Look for bargains, but look carefully, advises Andres Lofgren, an analyst at Giga Information Group, Inc. in Cambridge, Mass. "I would encourage users when evaluating products to make sure they get competitive bids. But I also would caution them to not strictly look at dollar per megabyte," he says. "When you just look at dollar per megabyte, you aren't considering the performance of that box, its reliability or its redundancy. Price is just one aspect of what you have to look at."

Casey adds that another pricing consideration involves planning. He advises buyers to build forward pricing caps into their original contract to limit what they will pay in the future for items such as additional disks.

Many vendors, most notably EMC Corp., promote extra functionality, such as remote mirroring, rather than price. And such functions aren't cheap. Some users, including those moving data

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RAID suppliers mentioned in this feature:

Boxhill Systems Corp.
New York
(800) 727-3863
www.boxhill.com
(photo, page 76)

Compaq Computer Corp.
Houston
(800) 345-1518
www.compaq.com
(photo, page 76)

Data General Corp.
Westboro, Mass.
(800) 328-2436
www.dg.com
(photo, page 76)

Digital Equipment Corp.
Maynard, Mass.
(800) 344-4825
www.digital.com
(photo below)

EMC Corp.
Hopkinton, Mass.
(800) 424-3622
www.emc.com
(photo, page 78)

Hewlett-Packard Co.
Palo Alto, Calif.
(800) 752-0900
www.hp.com
(photo below)

Hitachi Data Systems Corp.
Santa Clara, Calif.
(800) 227-1930
hdshq.com
(photo below)

IBM
Armonk, N.Y.
(800) 426-3333
www.ibm.com
(photo, page 78)

Storage Computer Corp.
Nashua, N.H.
(603) 880-3005
www.storage.com

Storage Dimensions
Milpitas, Calif.
(800) 765-7895
www.storagedimensions.com
(photo, page 78)

Storage Technology Corp.
Louisville, Colo.
(800) 456-7689
www.storagetek.com

Sun Microsystems, Inc.
Mountain View, Calif.
(800) 821-4643
www.sun.com
(photo below)

Symbios Logic, Inc.
Fort Collins, Colo.
(800) 862-7729
www.symbios.com

BUYER'S SATISFACTION SCORECARD

CONTINUED FROM PAGE 73

features. But they praised their RAID products in several areas that correlate with buying RAID servers from systems vendors, including compatibility with server hardware and software.

It makes sense to buy Unix RAID from systems vendors, says James Porter, president of Disk/Trend, Inc. in Mountain View, Calif. "Users can simplify their vendor lists and maintenance contracts. Multinational companies also have a better chance of keeping uniformity in their service contracts around the world with an IBM or Hewlett-Packard as opposed to small RAID vendors," he says.

The question remains: Which systems vendor best satisfies its RAID customers? The overall satisfaction grades indicate that it's Compaq and Digital Equipment Corp. But when looking at 11 subcategories that include variables such as manageability, performance and service, Digital's StorageWorks line has the edge by winning nine of them, compared with Compaq's two.

Several users said they most liked the modularity in Digital's StorageWorks. StorageWorks was designed to evolve with users and their changing needs, users say. "The only thing we know is that we don't know what our needs will be in six months," says Ramon Manzo, IS manager at the Office of Emergency Service in Riverside, Calif. "We can break down [StorageWorks] and rebuild it to our new needs."

Compaq, like Digital, builds its own RAID subsystems. It scored its two wins for capacity and performance. HP, which resells EMC Corp. and Clariion subsystems, often scored third. IBM and Sun Microsystems, Inc. generated about the same level of satisfaction out of its users throughout the survey. Both typically traded the fourth and fifth spots in the categories. The survey was conducted in December, before Sun and EMC introduced their new lines.

CAPACITY

Capacities are doubling every year, Porter says, and vendors are quick to keep up. Today's standard is 9G bytes of data per disk, with some vendors already delivering 16G bytes per disk. But because increasing a subsystem's capacity is simply a matter of adding more disk space, capacity doesn't differentiate RAID servers too much.

Still, 20% of total users surveyed graded their

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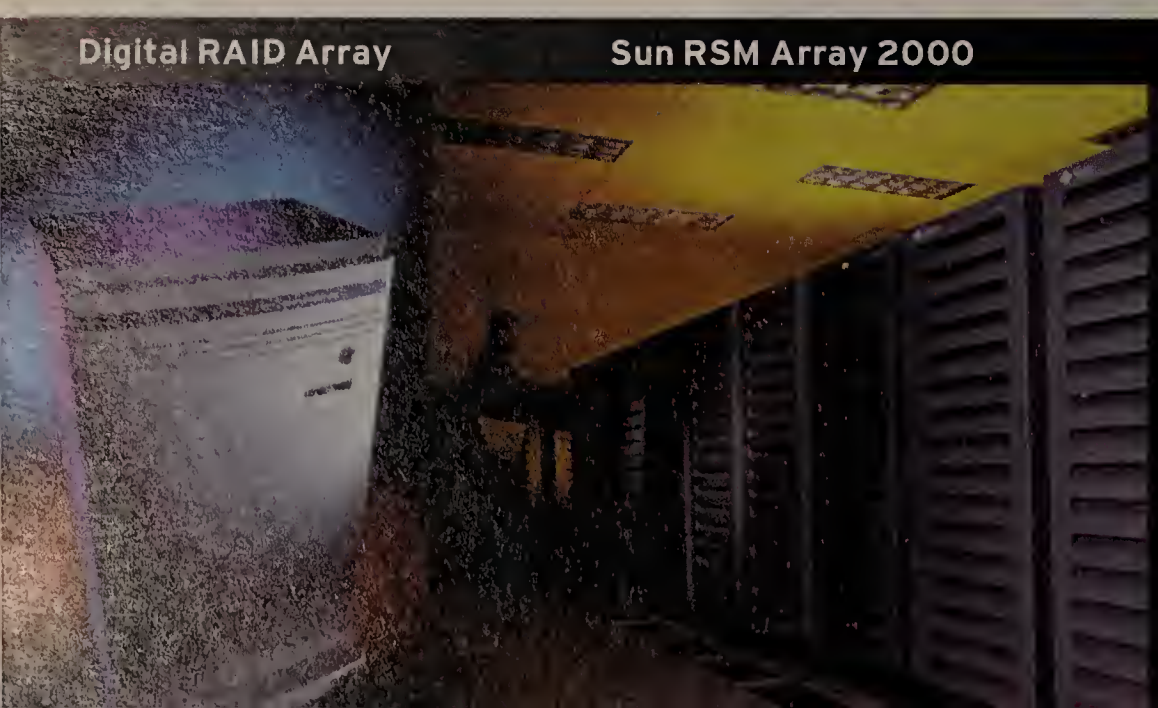

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BUYER'S ADVISORY: A LOOK AHEAD

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from mainframe environments to Unix-based data warehouses, should expect to pay twice as much for full-function RAID as they would for basic RAID subsystems. Citing EMC's offerings, Casey says, "The issue is whether you need the functionality. There may not be other choices [besides EMC], and you may pay twice as much as you would if you didn't require unique functionality."

The premium that users pay for EMC products may not be worthwhile to customers at the low end, but it could make sense to those who need 1T byte or more of storage and EMC-specific features, Casey adds.

FEATURES

Expect more vendors to follow EMC's lead and deliver functions such as remote mirroring, which allows information systems managers to protect data from natural or man-made disasters by creating backup copies of data at off-site locations. People can also protect data by shipping tapes to an off-site vault, but the data written to disk since the last backup will have to be reconstructed from log files or could even be lost entirely. Remote mirroring enables much faster recovery after a disaster: seconds, minutes or a few hours at most rather than several days.

"That's been a bigger deal in Europe in terms of users asking for [it] than in the U.S. But as people have become aware of what they have at risk if there is a fire, flood, earthquake or bombing, more and more companies are realizing they will have to make the investment," Casey says.

New management tools will continue to emerge this year, according to Lofgren.

Companies such as EMC, Data General Corp.'s Clariion division, Digital Equipment Corp. and Symbios Logic, Inc. have already delivered, or are ready to deliver, new RAID management tools. They include features that give managers graphical tools to perform tasks such as monitoring performance, producing reports and changing RAID levels, Lofgren says.

Several vendors, including Hewlett-Packard Co. and Storage Computer Corp., are promoting tools that change RAID levels on the fly. They allow a manager to make choices, such as whether to improve performance for several hours during the day by cutting back on mirroring and then restoring mirroring when performance is less crucial.

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Because our survey found only 10 users who went directly to Data General for RAID, DG and its Clariion RAID weren't compared with the others. However, those 10 users had DG on a pace to win this survey. It had the highest satisfaction in seven of the 11 categories, plus the highest overall satisfaction, with a score of 4.5 (A-).

HOW THEY RATED

OVERALL SATISFACTION

Digital	4.3	B+
Compaq	4.3	B+
Hewlett-Packard	4.1	B+
IBM	3.9	B
Sun	3.8	B

COMPATIBILITY WITH SERVER HARDWARE

Digital	4.5
Compaq	4.4
Sun	4.4
IBM	4.2
Hewlett-Packard	4.0

PRICE

Digital	3.5
Compaq	3.3
Hewlett-Packard	3.2
Sun	2.9
IBM	2.8

Based on a scale of 1 to 5, where 5 is very satisfied and 1 is not satisfied at all. Satisfaction grades are representative of the survey base and aren't projectable to the overall installed base.

Base: 201 users

BUYER'S SATISFACTION SCORECARD

CONTINUED FROM PAGE 74

satisfaction with capacity as average, which is relatively high given the flexibility users have to customize it. But interviews show that it isn't the potential capacity they graded low, but the price of increasing capacity.

PRICES

Despite RAID's falling prices, users are still less than thrilled with its cost. More than half the users surveyed said they were only moderately satisfied with price, and like capacity, no vendor holds an advantage.

What users can't seem to get past is that RAID is still much more expensive than "just a bunch of disks," Porter says. "RAID makers still get about 50% more in price than ['just a bunch of disks']. But the success of RAID shows that about 70% of the file server keepers out there feel RAID's advantages [availability and redundancy] are worth the 50% premium," he says.

And while the price per megabyte continues to drop, that 50% premium won't shrink until the price of RAID's overhead drops. "RAID only becomes really expensive when you buy the controllers, management software and everything else that make RAID useful," says Ed Bach, senior technical analyst at the North Shore Sanitary District in Gurnee, Ill.

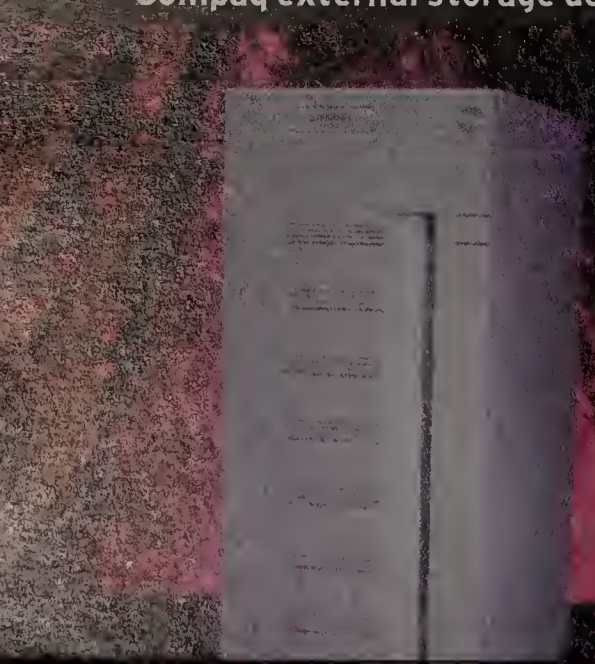
COMPATIBILITY

Satisfaction grades show that compatibility with server hardware and software is one issue users don't need to worry about when buying RAID from systems vendors. Hardware compatibility received the highest satisfaction grade of any category in the survey. And vendors that build their own RAID scored higher than HP, which resells RAID. "It all comes from one vendor [Compaq]. I expected and got a perfectly integrated system that works fine," says James King, a systems consultant at Transamerica Occidental Life Insurance Co. in Los Angeles.

Systems software compatibility is less ideal. Although 44% of the users said it was very good, a quarter of the respondents gave mediocre grades to their RAID products. One of the more common problems was getting the systems software to recognize the RAID drivers. "But it's nothing we couldn't handle," says David Babcock, data processing manager at Local Government Informa-

Scorecard, page 78

Compaq external storage device



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BUYER'S ADVISORY: A LOOK AHEAD

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Yet Lofgren sees trade-offs that users must consider with features such as what HP calls Autoraid. "It's an important area, and work should continue there. But it's still early, and I haven't seen much demand for it as of yet," he says.

PERFORMANCE

Gains in RAID performance will come partly from disk drive improvements, such as higher data rates, and partly from support of larger numbers of drives per controller, larger controller caches and faster interface connections. Casey says disk drive seek and rotation speeds increase slowly from year to year, so applications that require small, random reads and writes won't benefit much from next-generation disk drives.

However, newer drives typically offer faster data transfer rates, which will improve performance on applications that read and write large sequential data blocks. Casey also says applications that require large block transfers could see benefits from expected vendor moves to high-speed Fibre Channel Arbitrated Loop (FC-AL) connections and the competing Serial Storage Architecture (SSA), or even the 40M byte/sec. Ultra SCSI interface.

A year ago, analysts were waiting for FC-AL and SSA to take shape. Today, they're still waiting. They're hesitant to predict when products will be commonly available to IS shops. One of the key roadblocks for the high-speed connections is the need for server vendors to develop SSA and FC-AL interfaces. Sun has a 25M byte/sec. FC-AL interface, but analysts say the greatest gains will come when 100M byte/sec. interfaces are available.

But SSA and fiber may not help some users. A single broad pipeline provides little benefits to users whose applications are I/O intensive, according to analysts. Even 9G-byte disks present questions about whether they are right for all users; there are risks to packing twice as much data on a single spindle. In addition, some applications, such as transaction-oriented applications that involve a lot of random seeks, may perform better if data is spread across more 4G-byte drives rather than fewer 9G-byte drives.

"Storage is becoming more and more application-dependent, and you have to think about matching your storage solution to your application need," Casey advises.

Lofgren suggests that the best way for users to judge a RAID system's performance is to work with it in their own shops. "Vendors' benchmarks may have no relationship to a user's specific environment. If you can do it and you have the time, ask the vendor to bring in one of their boxes and let you run some of your own applications and your own benchmarks on it," he says.

SCALABILITY

Lofgren's key piece of advice for buyers when it comes to scalability is to look two years down the road. "When you buy a system today, ask yourself, 'What is my growth path for this? Will it keep up with demand for two years or whatever the life cycle of the system will be? Will it meet my needs, not only in terms of scalability but in terms of performance and reliability in the future?' "

Casey adds that fiber channel-based systems could help users deal with scalability issues in the future. He says one advantage of fiber channel is that its architecture could help managers string together modular arrays. That would make it easier to pilot-test an application using a minimum of storage and then add RAID boxes during a rollout.

Connolly is Computerworld*'s technology evaluations editor.*

BUYER'S SATISFACTION SCORECARD

CONTINUED FROM PAGE 76

tion Services in Brooklyn Center, Minn. "We needed to tinker with the HP drivers so they would work with Windows NT."

Users who gave "very good" grades for software compatibility most often bought their RAID products from vendors that make their own RAID subsystems. "It came as a complete system. I just manage NetWare. And as far as NetWare is concerned, it doesn't even know it's running a [Compaq] RAID server," says Henry Dumas, network administrator at Springfield Institution for Savings in Springfield, Mass.

RELIABILITY

Regardless of which vendor they choose, users are assured of getting a highly reliable RAID subsystem. Reliability was one of the highest-rated categories of the survey, just behind compatibility with server hardware. Several users told tales of failing drives, but they said those failures are inevitable and minor problems. "One is bound to go sometime. We just hot-swapped it out; it automatically rebuilt the partition, and none of our users ever knew there was a problem," Dumas says.

Burden is Computerworld*'s senior researcher, Scorecard/Firing Line.*

BUYER'S ADVISORY: TRENDS

■ Watch for two RAID formats — one performance-oriented and one capacity-oriented — to emerge in the next year or so, much the way they did for mainframe disk storage several years ago. This trend may develop as manufacturers build high-capacity drives, such as the upcoming 23G-byte, 5.25-in. disk drives. "The 23G-byte drives are for capacity-hungry environments. If you want the highest performance, it's not the form factor for you," says Andres Lofgren, an industry analyst at Giga Information Group.

■ Watch for SSA and FC-AL to converge, but not until after the first wave of SSA and FC-AL subsystems. Key sponsors of the rival standards have agreed to work together. But the earliest analysts expect a merged architecture is 1999.

■ Buyers in the open systems world have typically turned to their computer manufacturers for RAID systems. For that reason, most market share listings show systems manufacturers dominating the sector. Independent storage suppliers fit into the mix, as well. Those players, some of which provide RAID devices resold by systems makers, include EMC, Boxhill Systems Corp., Storage Computer Corp., StorageTek and Storage Dimensions. But even systems vendors often operate as independent suppliers, as shown by Data General's Clariion business unit and Hitachi Data Systems Corp.'s storage group.

■ Hard-disk density took a leap forward recently when IBM demonstrated components that work at 5G bit/sq. in., more than three times the density in today's leading-edge drives (1.36G bit/sq. in.). Finished products based on the new density are still several years away.

■ Analysts have been advising buyers to use caution when considering the new "storage appliances" that are being promoted as combinations of RAID, tape subsystems and management software, particularly for mixed operating system environments. Analysts warn that these appliances are expensive and don't provide IS managers with detailed control of their storage network.

EMC Symmetrix

IBM 7133

Storage Dimensions Superflex 500

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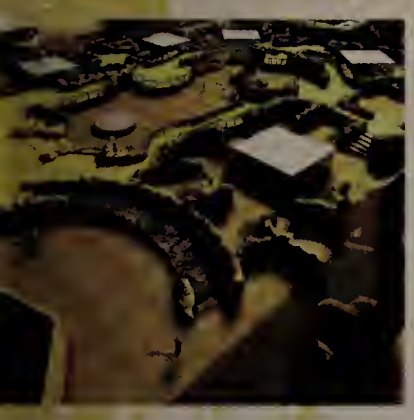

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In Depth

Mark Weiser, left, and John Seely Brown

JOHN HARDING

The Association for Computing Machinery (ACM) was founded in 1947, making it the elder statesman of information technology groups. To celebrate its 50th anniversary, the ACM is looking ahead to the next half-century.

One major marker in this celebration will be the March publication of *Beyond Calculation: The Next Fifty Years of Computing*. Editors Peter J. Denning and Robert Metcalfe invited nearly two dozen of the industry's pioneers and clear thinkers to submit essays. The collection looks at scientific, social and economic effects of the continuing revolution in computing.

In anticipation of the book's publication, *Computerworld* is devoting four In Depth sections to exclusive excerpts from *Beyond Calculation*.

This week's chapter is by Mark Weiser, chief technologist at Xerox Corp.'s Palo Alto Research Center (PARC), and John Seely Brown, chief scientist at Xerox and director of PARC.

If computers are everywhere, they'd better stay out of the way.

Less [INTRUSION] is more [USEFUL]

By Mark Weiser and John Seely Brown

THE IMPORTANT WAVES of technological change are those that fundamentally alter the place of technology in our lives. What matters is not technology itself, but its relationship to us. In the past 50 years of computation, there have been two great trends in this relationship: the mainframe relationship and the PC relationship.

Today, the Internet is carrying us through an era of widespread

Less intrusion, page 82

Less [INTRUSION] is more [USEFUL]

JOHN HARDING

CONTINUED FROM PAGE 81

distributed computing toward the relationship of ubiquitous computing, characterized by deeply embedding computation in the world. Ubiquitous computing — when lots of computers share each of us — will require a new approach to fitting technology to our lives, an approach we call "calm technology."

The most potentially interesting, challenging and profound change implied by the ubiquitous computing era is a focus on calm.

If computers are everywhere, they had better stay out of the way, and that means designing them so that the people being shared by the computers remain serene and in control. Calmness is a new challenge that ubiquity brings to computing.

When computers are used behind closed doors by experts, calmness is relevant to only a few. Computers for personal use have focused on excitement of interaction. But when computers are all around, so that we want to use a computer while doing something else and have more time to be more fully human, we must radically rethink the goals, context and technology of the computer and all the other technology crowding into our lives. Calmness is a fundamental challenge for all technological design of the next 50 years.

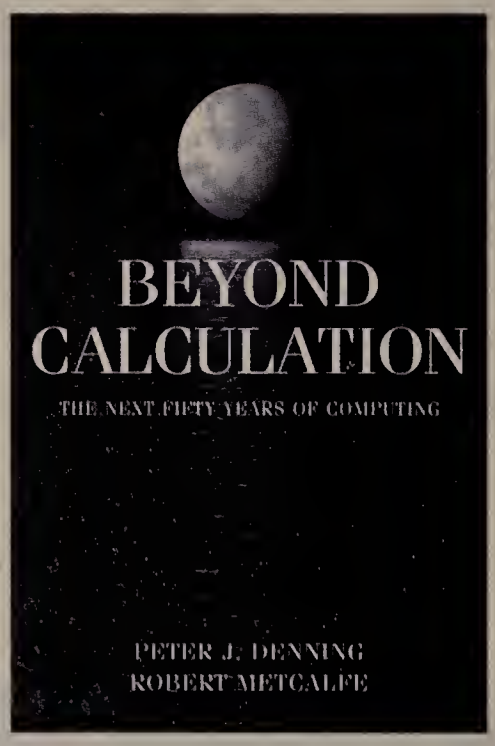
Designs that calm and inform meet two human needs not usually met together. Information technology is more often the enemy of calm. Pagers, cellular telephones, news services, the World Wide Web, electronic mail, television and radio bombard us frenetically. Can we really look to technology itself for a solution?

But some technology does lead to true calm and comfort. There is no less technology involved in a comfortable pair of shoes, in a fine writing pen or in delivery of *The New York Times* on a Sunday morning than in a home PC. Why is one often enraging, the others frequently calming?

THE PERIPHERY

We believe the difference is in how they engage our attention. Calm technology engages both the center and the periphery of our attention and in fact moves back and forth between the two.

We use "periphery" to name what we are attuned to without attending to explicitly. Ordinarily, when we are driving, our attention is centered on the road, the radio, our passenger, but not the noise of the engine. But an unusual noise is noticed immediately, showing that we were attuned to the noise in the periphery and could come quickly to attend to it.



Beyond Calculation: The Next Fifty Years of Computing

Edited by Peter J. Denning and Robert Metcalfe; Copernicus, New York; 320 pages; $27 (hardcover)

It should be clear that what we mean by "the periphery" is anything *but* "on the fringe" or "unimportant." What is in the periphery at one moment may in the next moment be at the center of our attention and so be crucial. The same physical form may even have elements in both the center and periphery. The ink that communicates the central words of a text also peripherally clues us in to the genre of the text through choice of font and layout.

A calm technology will move easily from the periphery of our attention to the center and back. This is fundamentally calming for two reasons.

First, by placing things in the periphery, we are able to attune to many more things than we could if everything had to be at the center. Things in the periphery are attuned to by the large portion of our brains devoted to peripheral (sensory) processing. Thus the periphery is informing without overburdening.

Second, by recentering something formerly in the periphery, we take control of it. Peripherally, we may become aware that something is not quite right, as when awkward sentences leave a reader tired and discomforted without knowing why. By moving sentence construction from periphery to center, we are empowered to act, either by finding better literature or accepting the source of the unease and continuing.

Without centering, the periphery might be a source of frantic following of fashion; with centering, the periphery is a fundamental enabler of calm through increased awareness and power.

Not all technology need be calm. A calm video game would get little use; the point is to be excited. But too much design focuses on the object itself and its surface features without regard for context. We must learn to design for the periphery so that we can fully command technology without being dominated by it.

SIGNS OF CALM TECHNOLOGY

Technologies calm as they empower our periphery. This happens in two ways. First, as already mentioned, a calming technology may be one that easily moves from center to periphery and back. Second, a technology may enhance our peripheral reach by bringing more details into the periphery. An example is a videoconference, which in comparison to a telephone conference enables us to attune to nuances of body posture and facial expression that would otherwise be inaccessible. This is calming when the enhanced peripheral reach increases our knowledge and thus our ability to act without increasing information overload.

The result of calm technology is to put us at home, in a familiar place. When our periphery is functioning well, we are tuned in to what is happening around us and also to what is going to happen and what has just happened.

It seems contradictory to say, in the face of frequent complaints about information overload, that more information could be calming. It seems almost nonsensical to say that the way to become attuned to more information is to attend to it less. It is these apparently bizarre features that may account for why so few designs properly take into account center and periphery to achieve an increased sense of "locatedness."

But such designs are crucial as we move into the era of ubiquitous computing. As we learn to design calm technology, we will enrich not only our space of artifacts, but also our opportunities for being with other people. When our world is filled with interconnected, embedded computers, calm technology will play a central role in a more humanly empowered 21st century.

Weiser *has worked at PARC since 1988. Before that, he was a professor and associate chairman in the computer science department at the University of Maryland. He has published extensively on topics that range from operating systems to technological ethics. Since 1988, his work has focused on ubiquitous computing. He's the drummer for Severe Tire Damage, the first live band on the Internet.*

Brown *cofounded the Institute for Research on Learning and is a fellow at the American Association for Artificial Intelligence. He has published more than 60 papers in scientific journals. He expanded the role of Xerox's corporate research to include topics such as organizational learning and ethnographies of the workplace. In addition to ubiquitous computing, his personal research interests include digital culture and user-centered design.*

For tips on how to identify the best IS talent on campus, visit our Web site at www.computerworld.com/careers

IT Careers

Some IS organizations merely pay lip service to family-friendly benefits. But others realize those benefits can be vital to recruiting and retaining top IS talent

TRUE friends of the family

By Alan R. Earls

JC Penney Co. employees don't quit when they're stressed out or overtaxed by family responsibilities — they select a new set of benefit options appropriate to their situation.

Stephanie Brown, a spokeswoman at the Dallas-based company, says the choices include several variations in working hours, on-site day care, health care and athletic facilities.

"When the company relocated from New York City in the late 1980s, employees were surveyed regarding the benefits and facilities they wanted. The response was overwhelmingly in favor of things that would help [people] with children," Brown says.

But it isn't a matter of JC Penney simply being nice. Dan Rude, controller at the retailer's information systems group, says the policies relieve him of having to worry about whether his direct reports can get a baby-sitter. And the policies have had a positive impact on retention. In one case, Rude says, a key IS employee was certain she would have to quit because of her children. But when Rude was able to accommodate her need for job flexibility, the employee opted to stay.

Similar tales are told at Sears, Roebuck and Co. IS staff at Sears headquarters in Hoffman Estates, Ill., can take advantage of telecommuting and work-from-home options, which were instituted two years ago with the support of Chief Information Officer Joe Smialowski. Those options would have been regarded as heresy in the 1980s. Mary Beth Swibes, a systems consultant at Sears, says the company now hopes to substantially increase the 4% of the IS workforce that takes advantage of the two options.

True friends of the family, page 84

"We would have lost an employee with 18 years of experience, but now she has been telecommuting for a year. We are happy, and she is happy."
– Mary Beth Swibes, Sears manager and telecommuter

TRUE friends of the family

CONTINUED FROM PAGE 83

IS employees who take full advantage of the telecommuting option often are involved in the early stages of a project, where "there is lots of coding work," Swibes says. But the option is open to any employee who has family issues that command his attention. And speaking as a manager, she says, the policy is tops for recruitment and retention. "We would have lost an employee with 18 years of experience, but now she has been telecommuting for a year. We are happy, and she is happy," Swibes says.

In another instance, Swibes says, it became clear to an IS manager while the policy was being finalized that he was going to lose a valued worker if he couldn't address stresses caused by conflicts between family and work priorities. Offering to be flexible with work schedules saved the day.

Measuring family values

To prove the business case for its family-friendly policies, AMS uses the following indicators:

Seventy-five percent of recent college graduates hired by AMS who completed a survey said "environment" was the top reason they chose AMS. Environment included people, culture, dress and atmosphere.

A Gartner Group, Inc. research report places the attrition rate in the computer industry at 20%; the same document says AMS' attrition rate is about 15%.

AMS last year hired 1,800 employees, of whom 800 were recent college graduates. For every 1,800 employees, the average computer company loses 360 from attrition. AMS loses 270 employees from attrition, so the difference between AMS and the average in the industry is 90 employees per year. — Alan R. Earls

Swibes, who telecommutes herself, says, "Telecommuting isn't a silver bullet. It doesn't solve all the problems, and it isn't easy." Nor, she stresses, is it ever a substitute for child-care or elder-care services.

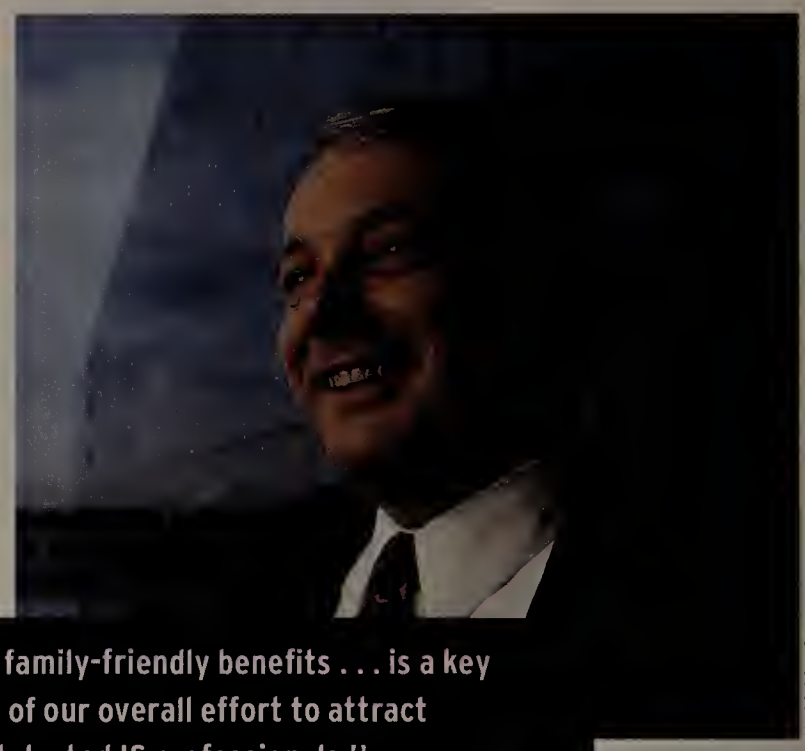
Indeed, Swibes says, it is vital to establish a clear structure, mutual expectations and a fairly regular schedule. Not everyone has the right work skills and personality to telecommute.

To ensure that areas of possible misunderstanding are avoided, Sears has a telecommunications guidebook, Swibes says. It covers the nitty-gritty details that need to be agreed upon to make the arrangement satisfactory for all.

Telecommuting also carries costs — increased spending on telephone services and equipment, for instance. "This year, we are starting to track those expenses so we can help managers understand how much it will cost them," Swibes says.

At Sears, the business case for the policies and the way they have evolved reflect the needs of IS. Telecommuters, the minority within the 4% who choose the alternative work plan, are based permanently at home. More employees use the broader option of occasionally working at home. But Swibes says, "Our business clients are here at Sears, so it is important that associates come in to the office some of the time."

Managers at American Management Systems (AMS), a consulting and systems integration company in Fairfax, Va., have been careful to define the roles and responsibilities involved in telecommuting. Donna Morea, a vice president in charge of the human services group, wrote the book on family- and people-friendly policies at AMS, *The Unofficial Guide to Life at AMS*.



MARC BERLOW

"Providing family-friendly benefits . . . is a key component of our overall effort to attract and retain talented IS professionals." — Joe Smialowski, CIO at Sears

Because AMS clients are scattered across the nation, Morea says, it makes sense to offer a wide range of work options. "What matters is that the client is happy," she says. So IS professionals at AMS have the options of working from home, using flextime, job sharing or working part time. *The Unofficial Guide* is a road map to the system for employees and managers.

Morea says AMS was family-friendly even 16 years ago when she met her future husband on the job, but today's generous policies are a corporate survival strategy.

"The policies fulfill two missions: They help us deepen the pool of talent we can access, and they broaden the diversity of our workforce," Morea says.

Family-friendly policies will help the AMS increase its head count by about 1,800 this year, Morea says. In one case, she says, a talented IS professional wanted to work at AMS but was reluctant to relocate from the Philadelphia area. Because the candidate was willing to go on-site with clients across the country, AMS accommodated her desire to stay in Pennsylvania and work from home.

Robert Blackwell, president of Blackwell Consulting Services in Chicago, makes a similar case for his company's flexible work schedules. "Your intellectual capital has to be motivated and happy, because a highly skilled knowledge worker is never stuck with you," he says.

Having flexible benefits provides a competitive advantage in recruiting IS professionals in an already tight job market. "If you are not sensitive to the needs for dependent care, flexible hours and the possibility of the virtual office, you are not going to get top-tier people," Blackwell says.

Nailing down what that competitive advantage is worth in dollars, though, isn't always easy. At AMS, survey data suggests a payoff (see story at left). But in some cases, it's simply a matter of positioning your firm relative to the competition.

That's the approach at Lotus Development Corp. in Cambridge, Mass. "We keep on top of what the marketplace is doing because it is a supply-and-demand question with software developers," says Joanne Laipson, senior manager of human resources services and benefits. That kind of comparison has led Lotus to offer a cafeteria-style benefits package that includes on-site day care and flexible hours. Driven by its proximity to major universities, Lotus offers a four-week sabbatical every five years.

Michael Carter, a senior vice president at Hay Group, Inc., a benefits consulting firm in Philadelphia, says no matter the cost, IS hiring managers are finding most family-friendly benefits to be very cost-effective.

"The background is that companies have been cutting spending on expensive benefits like health insurance for the last few years," Carter says. "By comparison, flextime and even subsidized day care are not that costly. But it earns big points with employees."

Indeed, IS recruiters and managers from a wide range of organizations say companies are increasingly crafting human resource policies that, depending on organizational goals and the specific wishes of employees, accommodate the realities of family responsibilities. Such policies soon may be the rule rather than the exception. Even the Ford Foundation recently weighed in with a study that supports the business benefits of work/family considerations (see story above).

Putting family first

All-female research teams from the Ford Foundation; Xerox Corp. in Stanford, Calif.; Compaq Computer Corp. in Houston; and Corning, Inc. in Corning, N.Y., set out to link work/family concerns with the corporate focus on the bottom line. At each of the three companies, a designated business unit was used for experimenting with nontraditional policies, with the employees as active participants.

Released late last year, the Ford Foundation report concluded that failure to address work/family issues undermines work efficiency and family life and that restructuring the way work gets done to address work/family issues can lead to "win-win" results. And, the report added, "As corporations continue to restructure and reinvent themselves, our findings suggest that linking such change efforts to work/family concerns greatly enhances their chances for success." — Alan R. Earls

Earls is a freelance writer in Franklin, Mass.

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- SR. ANALYST w/Powerbuilder/Sybase
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SYBASE DBAs - Responsibilities include production support, database design using SYBASE, capacity planning, and SYBASE performance tuning.

LAN/WAN Design and Development - Infrastructure and network architecture design will be primary responsibilities. Design LAN Addresses/Topography and Protocol Stack-Net BEUI, TCP/IP and IPX.

Systems Programmers - In addition to providing UNIX system and O/S level support for applications and utilities, responsibilities include system debugging, API and Middleware support and database administration.

E-mail Support - Responsible for the development and deployment of the E-mail interface to Lotus Notes as well as database maintenance and environment connectivity.

Desktop Deployment - Develop a desktop implementation plan and engineer the connectivity of the desktop to the network.

Application Support Managers - Provide technical and operational support, coordinate activities of help desk, senior database support and technical development.

Help Desk - As a primary user contact point, respond to inquiries, maintain databases for all inquires and provide production problem reports.

Quality Assurance Managers - Manage the development of release management, systems documentation and testing procedures.

Systems Documentation - Develop and maintain network schematics, logical and topology diagrams.

Operational Support Managers - Manage the activities of the Systems Administrator, Systems Programmer and LAN Support and maintain our leading edge in systems and network technologies.

For immediate consideration, contact Charlie Rose, Fax 312/228-4509, Dept. CAROSE/CW E-mail: Charles_Rose@TechSol.com

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If you want to really make waves in your field of expertise, forward your resume, indicating position of interest, to: **Technology Solutions Company, Attn: CAROSE/CW, 205 N. Michigan Ave, Suite 1500, Chicago, IL 60601; fax: 312/228-4509. Or check us out at http://www.TechSol.com**
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Avon Products Inc., the world's leading direct seller of beauty and related products is looking for systems professionals for their Information Technology Services Department in Westchester County. Opportunities include:

Telecommunications

We are seeking telecommunications professionals to assist in the implementation and on-going operation of the global corporate telecommunications network (AVONET). The ideal candidates will have 2-7 years experience in a progressive corporate environment, a strong working knowledge of LAN/WAN networking, routing and switching technologies and the ability to monitor and measure effectiveness and proactively respond to service situations. Experience with Frame Relay, TDM, switched Ethernet, VLAN's and ISDN services is required. We currently utilize IDNX multiplexors, Cisco routers and switches, Bay hubs and the related element management systems. Must have experience with network monitors, RMON and analyzers and test equipment. Experience with PRX's, IVR and voice networks is beneficial.

Systems Development

Sr. Programmer Analyst: This person will provide design, development, and maintenance of PowerBuilder applications for the Call Information Center System using development methodology. Will partner with Information Technology Services Customer, Support and Technical groups to insure customer requirements are met. This candidate must have a minimum of 3 yrs. PowerBuilder & Windows application Development, Cross Plafform/Client Server experience, and Exposure to MS Exchange.

Consultant. Will be responsible for planning the overall organization of major segments of Avon's data resources, designing major databases support of information requirements, and providing expert consulting in data management techniques and database utilization to other ITS personnel. Must have a minimum of 5 yrs. analysis and programming (multiple languages/ environments preferred). Hands-on DBA experience in major platforms, both hierarchical and relational. Candidate must be able to take immediate ownership of IMS v5.1 environment running under DBCTL.

Consultant-R&D Systems: Responsible for translating R&D requirements into system solutions. Activities include process modeling, system architecture, programming, testing, and implementation. Knowledge of Document Management, LIMS, PDM, Scientific Applications, Data Visualization, and Intranet application development is important. Current environment includes: PowerBuilder, Step 2000, Sybase, Windows 95, NT and Novell servers.

Sr. Programmer Analyst. Will be responsible for analysis, design, programming, and support of Avon's Representative Order Control System. Will develop program procedures to process complex systems with high level of reliability and speed. Moderate Domestic & International travel required. Must have Vax Basic skills. Should be familiar with FMS, CDD, Vax Systems Services, Decnet and Vax TCP/IP Communications. 3-5 yrs. in the Data processing field with experience on Digital VAX and Open VMS systems.

Programmer Analyst: Will provide programming and analysis support for Avon's Warehouse Management systems and Order Fulfillment. Moderate travel will be required, both domestic and international. Should have Microsoff Access and Windows NT. Must have 2-3 yrs. in the Data processing field with experience on PowerBuilder and Microsoff SOL Server.

Applications Manager: Will articulate a business system strategy and application architecture to support the current and evolving needs of the HR and Payroll functions. Lead a group of ITS professionals in the development of new applications that are part of the Human Resource and Payroll areas of Avon. This position also requires providing support for the existing environment that includes PeopleSoft and DBS (MSA payroll). Will be responsible for developing project plans via PWW and managing tasks to insure development efforts remain on schedule. Must be able to manage budgets, staff reviews and other administrative tasks. Extensive knowledge in the area of business analysis and project planning. Minimum 3-5 yrs. of HR Systems experience and PeopleSoff processing. Must have been involved with implementation of a large scale development effort. Must have ability to define testing environments and assess system scope.

Applications Manager R&D: Manage and lead a project team responsible for delivering system solutions to Avon's Research and Development Department. Play a key role as system integrator and system architect within R&D, participate in the development of global intranet applications coordinating information flows between the global R&D department and the marketing and manufacturing groups round the world. Knowledge of Document Management, LIMS, PDM, Scientific Applications, Data Visualization, and Intranet application development is important. Current environment includes: PowerBuilder, Step 2000, Sybase, Windows 95, NT and Novell servers.

Human Resources

Technical Recruiter: Responsible for recruiting in a fast-paced environment for the Information Technology Services Department. Ability to understand client needs. Must have had at least 3 yrs. technical recruiting experience in a technology environment, excellent interpersonal skills, behavioral interviewing experience, knowledge of various recruiting strategies & offshore recruiting experience. Should be conversant with various operating systems & networks.

Technical Services

Consultant: Will plan, analyze and implement security controls across mainframe and C/S platforms. Will provide technical hands-on expertise for CAACF2, MVS and Windows NT. 5-10 yrs progressive experience in a technical security practitioner role. Knowledge of ACF2/MVS, Windows NT Domain Security, MS PC Suite.

If qualified please send resume to Avon Products, Avon Plaza, Rye, NY 10581, Attn: Human Resources Dept RB.

TITLE: Developer II (MIS Department-Pricing) DUTIES: Develop and implement systems and applications related to Pricing (including retail, cost and list prices, customer catalogs, and competitive shops. Use Netview File Transfer Program. (NFTP) and concepts of Point of Sale (POS) systems. Provide second-level help desk support to retail stores during the Competitive Shop process, and to user depts. resolving pricing and UPC problems as they relate to the POS system. Employ an understanding of all channels of the office supply business in order to develop comprehensive systems across all computer platforms and lines of business. Performance monitoring and tuning programs and databases. Problem detection and troubleshooting for end-user groups; business process monitoring and evaluation; and leading/mentoring/ training junior level team members. Essential functions include: 1) support pricing, catalog and competitive shop systems 2) design new systems and enhancements related to pricing, catalog, or competitive shop systems 3) gather end-user requirements 4) develop new systems and enhancements related to pricing, catalog or competitive shop systems 5) report statuses to management 6) develop test plans and procedures 7) create and test programs and appropriate job control language 8) developing project time-line and estimates. REQUIREMENTS: Baccalaureate degree in CS or IS, or alternatively, in lieu of a Baccalaureate degree, 2 years of training or experience in CS or IS. In addition, the position requires 5 years experience in the job offered or, 5 years experience as a computer systems analyst/programmer using (1) AS/400, RPG, COBOL, CL, subfiles, and logical files and (2) Full Life Cycle system development methodology, which includes project scheduling, gathering end-user requirements, systems design, systems development, testing and implementation. Of the 5 years experience, at least 2 years doing AS/400 performance monitoring and tuning. Proficient in applications related to product pricing (including cost, retail, and list prices), and in catalog production and competitive shops, including interaction with company marketing and advertising personnel). Demonstrated ability to communicate effectively verbally and in writing for problem detection and troubleshooting for end-user groups; business process monitoring and evaluation; status reporting to middle and senior management; leading/mentoring/training junior level team members. SALARY RANGE: $49,141.00 to $73,711.00 a year; Overtime, n/a; DAYS/ HOURS/WK: 40, SCHEDULE: M-F 8am- 5pm; Apply by resume or in person to: Job Order No. FL-1546145, Attn: Job Service of Florida, 2660 West Oakland Park Blvd., Fort Lauderdale, Florida 33311. An EOE

CHIEF COMPUTER PROGRAMMER. Consults with appro. personnel to define end-user require's, program intent, & possible program modificat's. Develop programs from workflow charts & converts to comp. processable lang., using Powerbuilder & Sybase. Implements workflow computer sys. & new workflow comp. sys. for telecommunications indust. to track sales & engineer. requests. Designs data driven rules-based processing for workflow sys. Beta testing of Powerbuilder 5. Assists in implement. of future projects using Powerbuilder 5. Develops ancestors, methods & objects for projects. Respons. for entire life cycle of sys. develop., including data modeling, normalization, design, coding, testing, documentation & implement. Trains subordinates in programming. Must have extensive workflow & imaging exper. Required computer applications: Powersoff Powerbuilder 4, 3 with relational database. Oracle SQL, SOL-Plus, PL/SOL Sybase, SQL Server 4/10, Transact-SQL. Microsoft Windows SDK with 'C', DOS, Wang, PACE, PACE HLI, PACE Query, Open/Image Windows, COBOL 74, WIIS. Hoskyns CSA in Business Systems Analysis. SPC Superbase 4. PC LAN Installation, administration and management. (VINES Network Management). Must have Bach.'s Degree or equiv. in Computer Applic. or related and 6 years in job offered or 6 years experience as an Analyst, Support Analyst, Analyst Programmer or related experience. Must be able to relocate within the U.S. on a project-by-project basis. Hrs: 9a-5p, M-F, $58,400 per yr. Apply to Georgia Dept. of Labor, Job Order #GA 6066917, 2943 N. Druid Hills Rd., Atlanta, GA 30329-3909 or the nearest Dept. of Labor Field Service Office.

Software Analyst. Louisville, KY. Develop and support MICROSOFT ACCESS based Computer Assisted Training System. Develop and migrate data from a LOTUS based financial reporting subsystem to an EXCELL environment. Evaluate the applications/data connectivity for an Access based utility using C, WINDOWS and CBT Assistant module. Develop an ODBC interface between Microsoff Access and Visual Basic applications. Program and implement an online document retrieval facility using C, and SOL*SERVER. Design quality assurance procedures for Production Testing effort. Design technical and applications documentation text using WORD, WORDPERFECT and POWERPOINT. Requires Masters in Computer Science/Engineering/Education. Education to include coursework or equivalent in computer programming using C, PASCAL, or FORTRAN, Computer Applications, Computers in Education, Design of computerized software for training/ education. Sufficient proficiency required in Visual Basic and Microsoft Access, Windows/C to program and implement applications. $38,600/yr. EOE. Resume to: Dept for Employment Svcs, 275 E. Main St., 2-W, Frankfort, KY 40621, Attn: Mary Rogers, JO#0366645

SENIOR SOFTWARE DEVELOPER: Design and develop client/server applications in open environment including design and developing GUIs and databases, performance systems analysis, and designing, developing, testing, installing and maintaining customized systems. Analysis, design, development and implementation of three-tier object oriented client/server communication systems. Analyze and design business processes through data modeling and process modeling. Requires: M.S. in Computer Science. 3 years in experience in developing client server systems including networking programming. Demonstrated knowledge of UNIX, TCP/IP sockets and FAX server. Strong background in C, C++, MFC, ORACLE, systems programming and GUI development. Good communications skills. 40 hrs/wk, $60,000.00/yr. Send two resumes/respond to Case # 61674, P.O. Box,, 8968,, Boston, Ma 02114.

SYSTEMS ENGINEER: ORLANDO, FL, 8:00A.M - 5:00P.M., Will research, design, and develop computer software systems, in conjunction with hardware product development for medical, industrial, military, communications, aerospace, and scientific applications, applying principles and techniques of computer science, engineering, and mathematical analysis. Analyzes software requirements to determine feasibility of design within time and cost constraints. Consults with hardware engineers and other engineering staff to evaluate interface between hardware and software, and operational and performance requirements of overall system. Will formulate and design software system, using scientific analysis and mathematical models to predict and measure outcome and consequences of design. Will develop and direct software system testing procedures, programming and documentation. Will consult with customer concerning maintenance of software system. $93,600/ annually. Special requirements include six months experience in Tuxedo and C++ Software and also a Bachelor of Science in Electronics. Send Resume to: Job Service of Florida, 2312 Gulf-to-Bay Boulevard, P.O. Box C, Clearwater, Florida 34618-4090. Refer to Job No: FL1554409.

SOFTWARE ENGINEER to design, develop, test, implement, maintain and support Voice Processing systems based on T1, E1, ISDN (U.S. and European) analog and digital telephony products using Dialogic Voice Processing and telecom network boards; Design and develop Voice Processing applications and custom user interfaces on DOS and UNIX platforms using C, C++ and other speech software libraries; Design, implement and integrate RDBMS systems for the Voice Processing applications using ESQL; Analyze and review existing systems to evaluate effectiveness and prepare technical documents and reports. Require: M.S. degree in Electrical/Computer Engineering with six months of experience in the job offered. Salary: $47,300 per year, 8:30 am to 5:30 pm, M-F. Send resume to: Alese Russell, HR Manager, Syntellect, Inc., 1000 Holcomb Woods Pkwy., Bldg. 410A, Roswell GA 30076. Attn: Dept. ND

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Requirements include one year of specialized experience equivalent to the GG-13 level to include knowledge of the most advanced state-of-the-art data processing concepts, methods, and techniques; concepts of system life cycle methodologies; structures analysis and design philosophies; and systems engineering disciplines and integration techniques. Knowledge of administrative management, procurement and contracting regulations and policies, as well as excellent communications skills, are also necessary.

Candidates are required to submit a resume or Federal application (OF-612) and salary history no later than **March 17, 1997** to: **U.S. Nuclear Regulatory Commission, Attn: J. Hunter/K. Lanigan, Office of Personnel, Mail Stop T-2-D32, (Dept. A-97108), Washington, D.C. 20555-0001.** Applicants must address all the rating factors listed in the Vacancy Announcement. Vacancy Announcement information and application materials should be obtained by calling the NRC Personnel Smartline at **(800) 952-9678.** Refer to Vacancy Announcement #9743001.

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Systems Analyst/Team Leader for passenger cruise line. 40-hour week, 9am-6pm, $51,667 per year. Will be responsible for supporting employer's cruise reservation system with multiple CRS front ends. Will maintain communication applications for linking the reservation system to different airline networks and vendor systems; design and development of new applications to link company's data base with vendor systems using APPC and date queues; lead a team of developers, write comprehensive technical specifications and develop Workplans/ Timelines to achieve project due dates. Liaison with user departments in joint development of functional specifications for new projects by understanding the user requirements of different business areas. Bachelor's or foreign degree equivalent, 2 years experience in job offered or 2 years as systems analyst. 2 years prior work experience on AS400, RPGIV, CL/400, CPI-C, APPC communication applicants and in the design and development of CRS reservation system. Supervise 4 employees. Submit resume to: Job Service of Florida, 701 SW 27 Avenue, Room 47, Miami, FL 33135-3014 Re: Job Order Number FL-1553917. EOE

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SENIOR SOFTWARE DEVELOPER. Resp. to analyze, design and develop client/server system for telephone service using UNIX System V interprocess communication and network navigator techniques. Will test and modify operations and correct errors in system using debug tool (xdb) in HP-UX operating system. Resp. for design and development of large database applications using C, embedded SQL language and Ingres database. Evaluate and redesign existing system recovery file management using shell and AWK script technology. Req: B.S. in Computer Science or rel. field plus 3 yrs. exp. in job offered or 3 yrs. exp. as systems analyst; must have 3 yrs. exp. in system programming for telecommunication network management, using contract-typed network manager, UNIX, C, Ingres, shell script and awk script; familiarity w/ HP-UX symbolic debugger (xdb) and memory management in C programming. Salary: $55,000/yr, 9a-5p, 40 hrs/wk. Apply by resume (2 copies) to: Georgia Department of Labor, Job Order # GA 6060722, 2943 N. Druid Hills Rd., Atlanta, GA 30329-3909 or the nearest Department of Labor Field Service Office.

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Network/UNIX System Administrator - Atlanta, GA. Network configuration, network installation, UNIX system administration, systems configuration, systems installation, task automation via script or C code, system and network troubleshooting on Hewlett-Packard lines. MSCS/ MSEE and 2yrs exp. 40hr/wk, 8AM-5PM, M-F, $50K/yr. Must have proof of legal authority to work in the U.S. Apply in person or submit resume in duplicate to: Georgia Department of Labor, Job Order # GA 6065110, 2943 N Druid Hills Road, Atlanta, GA 30329-3909 or the nearest Department of Labor Field Service Office.

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Excellent opportunity for a professional **Programmer** at our International service organization. This position will maintain existing and develop new programs using Informix-4GL. The selected candidate will have a Bachelor's in Computer Science with 6 - 12 months programming experience, or an Associates degree with applicable experience. For confidential consideration, please forward your resume and salary history to:

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Senior Software Engineer. Duties: Lead team responsible for designing specifications and overseeing implementation of client/server software systems for business applications. Work directly with clients to analyze software requirements in order to match business needs and project specifications. REQ: Master of Science Degree in Computer Science. One year experience as a computer programmer or server developer which includes one year experience in the following areas: 1) object-oriented client/server software development utilizing MS-Windows, C, C++, Visual Basic, GUI development, SQL, ORACLE and UNIX programming; 2) networking using the following protocols: TCP/IP and Socket API; 3) Internet/Intranet web development using HTML and CGI scripting (all inclusive of the overall one year experience requirement). Salary: $52,000/Year. Hours: 40 Hours/Week; 8AM to 5PM. Direct replies to Mary Rogers, Department for Employment Services, 275 East Main Street, 2nd Floor West, Frankfort, KY 40621, Job Order #036646.

Systems Analyst to install Oracle d/bases & development tools, maintain d/bases including back-up, recovery, users, tables, indexes & monitoring d/bases; tune d/bases including SQL statements, memory & I/O application including requirement analysis, design, development & implementation of application software; enhance functionality of existing applications using SQL*DBA, SQL*Plus, SQL*Forms, Pro*C, C, DOS & UNIX; build interfaces between different d/base systems, access heterogenous d/base systems; Reqs. Bach. in Comp. Sci., Comp. Tech., Comp. Engg., Comp. Info. Systems or its foreign equiv., 1 yr exp in job offered or 1 yr related exp such as Programmer Analyst. Exp must include d/base administration & development using Oracle, SQL*DBA, SQL*Plus, SQL*Forms, SQL*Reports & Pro*C; $52,000/yr, $23.63/hr OT; 40 hrs/wk, OT as req'd 8a-5p. Apply in person or by resume to Georgia Dept. Of Labor, J.O. #GA6065313, 1535 Atkinson Rd., Lawrenceville, GA 30243-5601 or nearest Dept. Of Labor Field Service Office.

Software Engineer: Dev, test, document financial reporting system computer software in APL on IBM mainframe & LAN configured PCs. Dev, maintain periodic reporting APL systems & MIS. Research, upgrade APL system. Detect, modify syntax/logic errors. Analyze, review, alter programs to increase operating efficiency/adapt to new req, document software dev, logic, coding, corrections. Provide tech assist on software/app. dev. Apply knowledge of APL, CP/CMS, EXCEL/WORD (Macros), REXX, ACCESS, VB, LOTUS NOTES, SAS, OO, VM Architecture (VMO, VME, VMA), stand alone / networked PCs, PCLAN, OS/2, DOS/Windows Workstations, CMS/ CP, Spreadsheet, Macros, Word Processing, GUIs, RDBMS and Object orientation in mathematical modeling, forecasting, sales, marketing, corporate strategy, human resources, scheduling, planning, costing & financial apps. Req: Master's in Operations Research & Management + 4 yrs exp., $58,000/year, 40 hrs, 8:30-5. Submit resume to: West Dade Jobs & Benefits, 9485 West Flagler Street, Miami, FL 33174-2010. RE: Job Order# - FL 1548462.

Systems Analyst. 40 hrs wk. $45K per yr. Ba Computer Science. 2 yrs exp as systems analyst or 2 yrs exp as a programmer. Person must have knowledge in the following: 6 mos in oracle; 3 months Sql forms; 6 months SQL; 3 months client/server methodology; 3 mos power builder; 3 mos unix. Person will perform software systems implementation and support. Will coord with ISS Dept. to insure disaster recovery activities are adequate and consistent with county wide efforts. Rsch software options, prep. costs benefits analysis and determine appropriate choice. Analyze system needs, implement solutions, administer multiuser systems training and support and troubleshoot. Send resume to Florida Jobs and Benefits Center, 2660 West Oakland Park Blvd., Fort Lauderdale, Fl 33311-1347 Attn: Job Order FL1506502.

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Sftwr Developers: Design, develop, implem't & test client-server (CS) applic'ns w/ PowerBuilder (PB) & Object Oriented Program'g Methodo'gy; Provide PB train'g, monitor'g & co-develop't for clients; Design, develop, maintain & test GUIs w/i CS architecture w/ Stored Procedure for database managem't w/ Sybase; Work alone at client site/lead developers in-house to design database models, optimize database managem't and train users CS & PB progrm'g. MS in Engineering, one year exper'ce in any posi'n w/exper'ce in PB & Sybase; 45,700/yr, 40h/w, 8-5, Resume to Job SVC of FL, PO Box "C", Clrwtr, FL 34618. Job#FL-1556309

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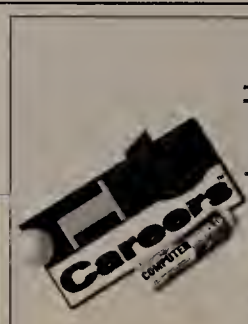
Systems Analyst. Analyzes user requirements, procedures, and problems to automate processing or to improve existing computer system. Bachelor's degree in computer science, engineering, or math-related, and two years experience in job offered or in design and development of customized software. Must be able to travel. Two years experience ADW, KEY, CICS, DB2. $41,000/yr. Interested applicants apply by resume to Georgia Department of Labor, Job Order # GA 6067058, 2943 N. Druid Hills Road, Atlanta, GA 30329-3909 or the nearest Department of Labor Field Service Office.



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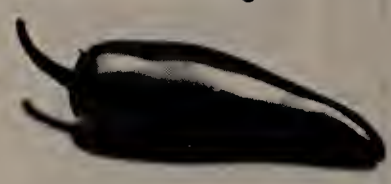

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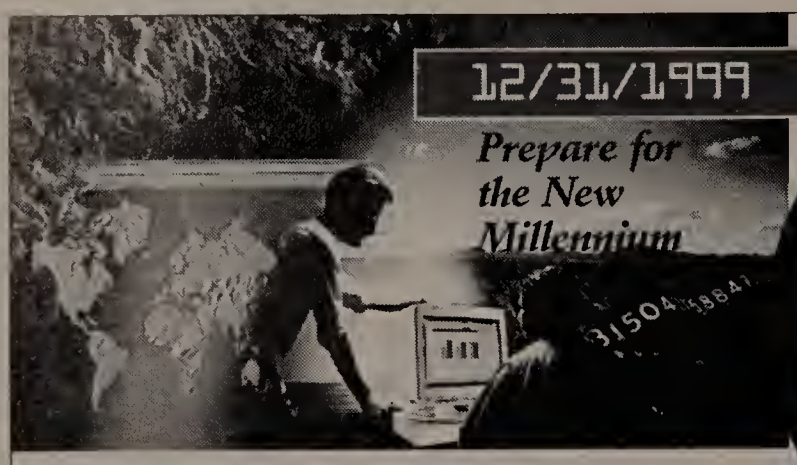

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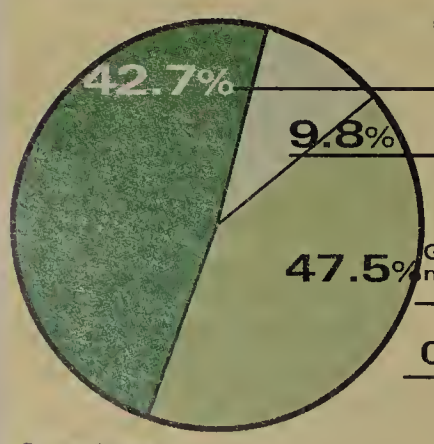

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Regional Growth Analysis

CorpTech, a directory publisher in Woburn, Mass., tracks the U.S. 45,000+ technology manufacturers. This survey relates to the 30,941 tracked firms with fewer than 1,000 employees.

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Marketplace

SPEED and the INTERNET define the network printer market

By Suruchi Mohan

THERE ARE THREE KEY TRENDS to note in the network printer arena: Speed is an ever-increasing reality; black-and-white printers still have an edge over color printers, with laser printers being the workgroup or department workhorses; and Internet printing will be the next big wave after speed and formatting problems have been solved.

"There is a new focus on speed, to over 12 pages per minute," says Larry Jamieson, a senior consultant at Lyra Research, Inc. in Newton, Mass. He says 16 to 24 page/min. is the new primary focus of network printer vendors. Speed is more important in the networked environment than in the personal printer space because several people use the same network printer.

Many companies compete in the network printer market, which is defined as any printer that outputs more than 8 to 12 page/min. Although most large companies use printers that output more than 12 page/min. on their networks, many smaller companies use printers that print 8 to 12 page/min.

Hewlett-Packard Co. is the leader in the 8 to 12 page/min. and 21 to 29 page/min. markets. And Lexmark International, Inc. leads the 13 to 20 page/min. market, according to International Data Corp. (IDC) in Framingham, Mass. Other players jostling for rank in various printer categories include Apple Computer, Inc., QMS, Inc. and IBM.

Color printing is making inroads in the market, although for the most part it's too slow and specialized for the network, analysts say. That doesn't mean there aren't color network printers. In the past year, several companies — including Apple, HP, QMS, Tektronix, Inc. and Xerox Corp. — have introduced color laser printers that cost more than $4,500. The cost of color laser printers, which can go as high as $8,500, keeps them from widespread use.

But color printing is still specialized, according to Michael Weiss, president of MWA Consulting, Inc. in Palo Alto, Calif. The Internet, with its emphasis on color, might put pressure on the older systems and lead to their replacement. The Internet so far doesn't lend itself well to printing, says Keith Waryas, an analyst at IDC. Downloading and printing documents off the Internet can be time-consuming and often causes formatting problems.

That's because images and text that appear on the 'net are in Hypertext Markup Language (HTML) and can't be printed as such. They must be converted to a printing language, such as Printer Control Language (PCL) or PostScript, Waryas says. That results in a long processing time, and on-screen images often appear different on paper.

The solution is to create support for HTML printing, Waryas says. HP has taken the first steps with its PCL 6, which is included in its LaserJet 5 series. PCL 6 is a graphical, object-oriented language, so images are more crisp. Because of the similarities between this latest version of PCL and the way Internet images appear on-screen, documents can be processed much faster than previously, he says.

The following are some tips from the experts on choosing an Internet printer for your network:

- Make sure the printer comes preconfigured for your network. There are no standard printers.
- Determine your needs. Do you need HP's PCL and Adobe Systems, Inc.'s PostScript? Getting both for your printer may boost your costs. For example, an $800 printer with PCL could cost $1,100 with PostScript added.
- Provide at least two printers. There should be an express line for those who need to print only a quick page or two.

Mohan is a freelance writer in Mountain View, Calif.

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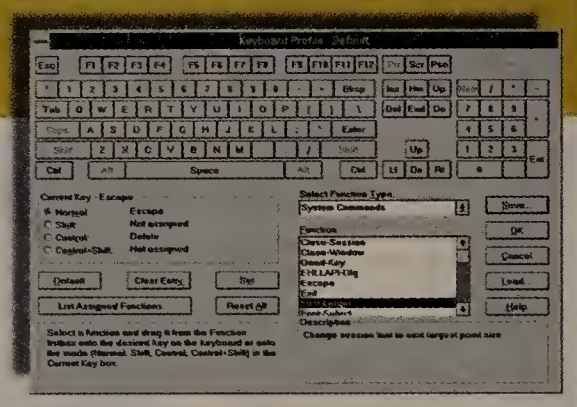

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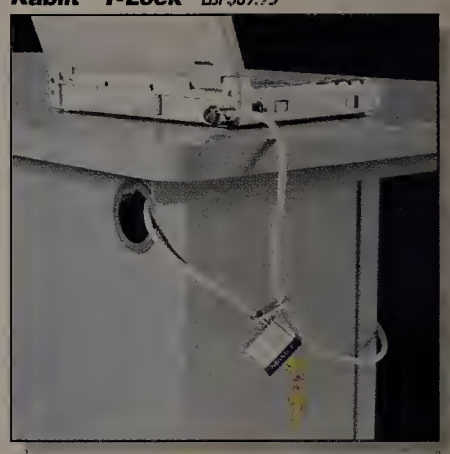

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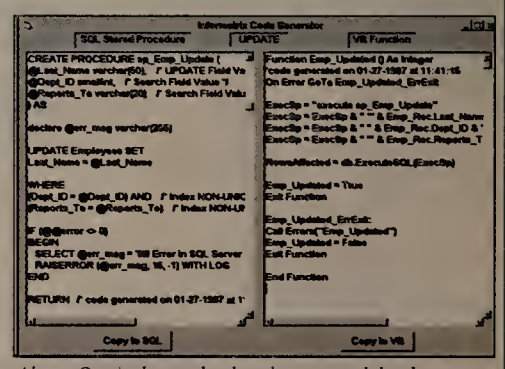

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DOLLAR

3 COM Corp.	-6.88
American Power Conversion	-6.13
Raptor Systems	-4.25
US Robotics	-4.13
Brooktrout Technology	-3.88
Cascade Communications	-3.63
Data Race Inc.	-3.63
Picturetel Corp.(L)	-3.25

INDUSTRY ALMANAC

Superstores face chilly winter

A chilling winter wind has been blowing through computer superstores lately, leaving behind frosty revenue figures that have sent some executives out into the cold.

Early last month, Tandy Corp. (NYSE:TAN) said it would shut down all of its Incredible Universe stores and shutter 20% of its 108 Computer City stores.

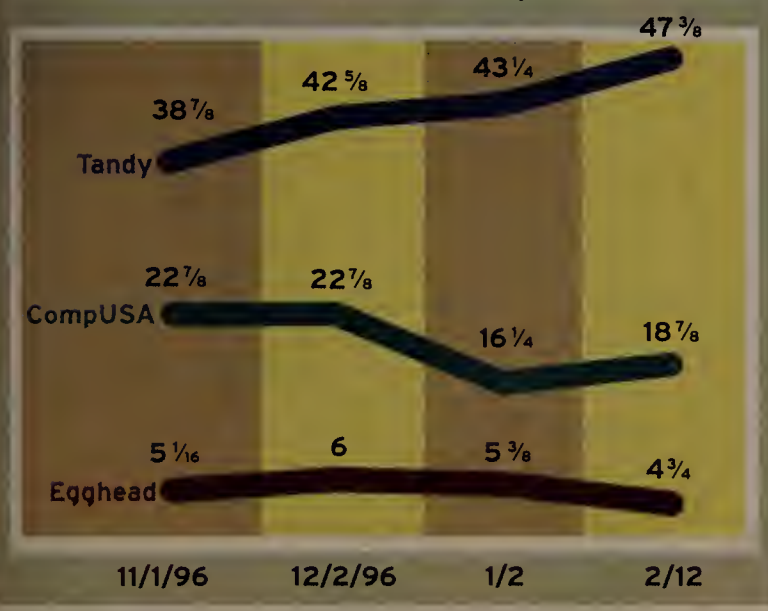
Egghead, Inc. (Nasdaq:EGGS) also said it would close half of its 156 retail stores and reduce its number of geographical markets from 54 to 24. Following this announcement, Egghead's chief executive and two senior vice presidents resigned.

Although these firms have fallen out of favor among Wall Street analysts, competitor CompUSA, Inc. (NYSE:CPU) is as attractive as a 70-degree day. Jack Seibald, an analyst at Blackford Securities Corp. in Garden City, N.Y., said CompUSA has weathered the winter retail storms by focusing on a broad range of business offerings beyond strictly retail sales. By selling directly to corporate, education and government agency customers, CompUSA has been able to "develop a more complete business model" than its superstore competitors, Seibald said. He gives the stock a Buy rating.

Paul Berg, an analyst at Morgan Keegan & Co. in Memphis, said he also likes the way CompUSA has bucked the computer retail trend. "Their offerings are unique," he said. "They have a better selection than their competitors and include customer service, repair and delivery." — Stewart Deck

RETAIL UPS AND DOWNS

Recent stock prices of resellers CompUSA, Tandy and Egghead Software have all shown some strain of slowing retail sales



Exch	52-Week		Range	Feb. 14 2PM	Wk Net Change	Wk Pct Change
Communications and Network Services					**OFF 1.65%**	
COMS	81.38	33.50	3 COM Corp.	41.63	-6.88	-14.2
AIT	66.75	49.63	AMERITECH Corp.	63.00	3.50	5.9
T	46.88	31.63	AT & T	39.63	1.38	3.6
ASND	80.25	38.50	Ascend Communications	64.50	-1.81	-2.7
BNYN	10.75	3.25	Banyan Systems Inc.	3.88	-0.38	-8.8
BAY	48.25	18.13	Bay Networks Inc.	20.00	0.88	4.6
BEL	80.38	43.50	Bell Atlantic Corp.	70.75	2.88	4.2
BLS	46.75	35.25	Bellsouth Corp. (H)	46.13	2.75	6.3
BRKT	42.25	13.88	Brooktrout Technology	20.88	-3.88	-15.7
CS	43.63	26.50	Cabletron Systems	31.88	1.25	4.1
CSCC	91.25	32.13	Cascade Communications	32.63	-3.63	-10.0
CGRM	24.13	11.63	Centigram Communications	13.25	0.00	0.0
CSCO	75.75	40.50	Cisco Systems Inc.	62.75	0.75	1.2
CLIX	8.25	3.13	Compression Labs Inc. (L)	3.38	0.13	3.8
CMNT	10.50	4.25	Computer Network Tech.	5.63	0.13	2.3
XCOM	12.75	4.75	CrossComm	8.50	0.00	0.0
DIGI	36.50	12.63	DSC Communications	22.38	0.25	1.1
FORE	44.75	23.50	FORE Systems Inc.	29.13	-0.25	-0.9
GDC	18.88	9.13	General Datacomm Inds.	9.38	0.13	1.4
GSX	46.00	34.38	General Signal Networks	45.50	0.63	1.4
GTE	49.25	37.75	GTE Corp.	48.63	1.63	3.5
LU	57.50	29.75	Lucent Tech.	57.50	2.88	5.3
MADGF	46.63	8.13	Madge Networks NV	11.88	-1.88	-13.6
MCIC	37.50	22.38	MCI Communications Corp.	35.88	-0.50	-1.4
MNPI	34.50	5.50	Microcom Inc.	12.63	-0.25	-1.9
NETM	18.88	3.75	NetManage Inc. (L)	3.75	-1.13	-23.1
NTRX	10.88	3.75	Netrix Corp.	5.00	-0.25	-4.8
NCDI	16.25	2.88	Network Computing Devices	13.38	-1.38	-9.3
NWK	33.63	11.13	Network Equipment Tech.	17.63	-1.13	-6.0
NETG	30.25	15.25	Network General	26.00	-1.81	-6.5
NN	37.25	20.25	Newbridge Networks Corp.	34.00	2.00	6.3
NT	75.00	45.00	Northern Telecom Ltd.	75.00	4.13	5.8
NOVL	15.63	8.75	Novell Inc.	11.88	0.13	1.1
NYN	58.75	42.00	Nynex Corp.	52.88	2.13	4.2
OCTL	31.75	13.50	Octel Communications Corp.	16.50	-0.25	-1.5
ODSI	29.00	11.25	Optical Data Systems Inc.	14.75	-1.13	-7.1
PAC	40.63	25.88	Pacific Telesis (H)	40.38	2.00	5.2
PCTL	44.72	16.38	Picturetel Corp. (L)	16.38	-3.25	-16.6
PTON	6.50	2.06	Proteon Inc.	2.38	-0.31	-11.6
RACO	7.00	3.50	Racotek Inc.	4.13	0.13	3.1
RETX	10.88	3.25	Retix	6.38	-0.06	-1.0
SBC	60.25	46.00	SBC Communications	56.38	2.88	5.4
SFA	20.38	12.00	Scientific Atlanta Inc.	18.63	0.13	0.7
SHVA	87.25	15.75	Shiva Corp. (L)	17.63	1.13	6.8
FON	45.50	34.50	Sprint Corp.	43.00	1.13	2.7
SMSC	18.75	8.38	Standard Microsystems Corp.	8.50	-0.50	-5.6
USRX	105.50	45.88	US Robotics	62.25	-4.13	-6.2
USW	37.50	27.25	U S West Inc.	34.00	1.88	5.8
XIRC	31.13	9.63	Xircom	25.00	-2.94	-10.5
XYLN	76.00	18.50	Xylan Corp. (L)	20.88	0.13	0.6
PCs and Workstations					**UP 1.50%**	
AALR	15.25	6.13	Advanced Logic Research	10.00	-0.13	-1.2
AAPL	30.25	15.13	Apple Computer Inc.	16.06	0.06	0.4
ASTA	8.50	3.94	AST Research Inc.	4.75	0.00	0.0
CPQ	87.88	35.88	Compaq Computer Corp.	83.25	2.00	2.5
DELL	72.38	13.75	Dell Computer Corp.	70.19	6.19	9.7
GATE	66.25	23.38	Gateway 2000 Inc.	62.25	3.13	5.3
HWP	57.75	37.75	Hewlett Packard Co.	50.38	-1.13	-2.2
MUEI	25.00	8.75	Micron International Inc.	18.50	-1.38	-6.9
NIPNY	65.00	49.88	NEC America	58.88	2.88	5.1
SGI	30.13	17.88	Silicon Graphics	25.75	0.38	1.5
SUNW	35.13	20.38	Sun Microsystems Inc.	34.63	0.81	2.4
Large Systems					**UP 0.37%**	
AMH	14.00	8.00	Amdahl Corp.	10.63	-0.25	-2.3
DGN	19.00	9.00	Data General Corp.	18.75	0.75	4.2
DEC	75.63	28.38	Digital Equipment Corp.	34.25	-0.88	-2.5
IBM	170.13	89.13	IBM	144.50	-2.88	-2.0
MDCD	20.25	3.88	Meridian Data Inc. (L)	4.50	-0.13	-2.7
NETF	6.13	2.25	NetFrame	2.50	0.00	0.0
SQNT	20.13	10.13	Sequent Computer Sys.	19.25	1.63	9.2
SEQS	4.88	1.88	Sequoia Systems Inc.	2.44	0.06	2.6
SRA	32.88	16.63	Stratus Computer Inc.	31.63	-1.13	-3.4
TDM	15.25	8.38	Tandem Computers Inc.	13.25	-0.13	-0.9
UIS	9.13	5.38	Unisys Corp.	6.88	0.13	1.9
Software					**OFF 0.23%**	
ADBE	45.13	28.50	Adobe Systems Inc.	38.00	1.75	4.8
AMSWA	7.81	3.63	American Software Inc.	7.00	-0.19	-2.6
APLX	42.50	10.63	Applix Inc. (L)	12.94	-2.06	-13.8
ARSW	82.75	21.00	Arbor Software	30.25	2.88	10.5
ADSK	44.25	18.50	Autodesk Inc.	34.13	3.63	11.9
BGSS	31.75	14.88	BGS Systems Inc.	28.50	0.75	2.7
BMCS	51.00	25.00	BMC Software Inc.	47.75	3.13	7.0
BOOL	27.50	14.00	Boole and Babbage	25.50	-1.50	-5.6
BORL	21.25	4.75	Borland Int'l Inc.	6.38	-0.06	-1.0
BOBJY	55.50	8.63	Business Objects	12.25	-0.94	-7.1
CAYN	11.88	3.81	Cayenne Software Inc.	5.25	0.00	0.0
CNTR	6.75	2.63	Centura Software	4.38	-0.06	-1.4
COGNF	39.50	15.25	Cognos Inc.	24.50	-2.13	-8.0
CA	67.88	37.63	Computer Associates	48.13	0.88	1.9
CVN	13.25	5.75	Computervision Corp.	6.63	-0.50	-7.0
CPWR	69.25	21.00	Compuware Corp.	65.25	0.13	0.2
CSRE	32.00	10.75	Comshare Inc.	15.00	0.13	0.8
COSFF	13.88	6.38	Corel Corp.	6.50	-0.06	-1.0
DWTI	8.25	2.63	Dataware Technologies Inc.	5.50	-0.25	-4.3
FILE	67.00	18.38	Filenet Corp.	19.88	-0.88	-4.2
FRTE	81.75	24.75	Forte Software	32.00	-1.00	-3.0
FTPS	15.88	4.88	FTP Software Inc.	6.75	-0.25	-3.6
HUMCF	47.63	23.00	Hummingbird Comm. Ltd.	31.25	0.00	0.0
HYSW	26.38	9.75	Hyperion Software Corp.	23.50	0.88	3.9
IRIC	16.38	11.00	Information Resources	15.38	0.13	0.8
IFMX	36.75	16.88	Informix Corp.	19.00	-1.75	-8.4
INGR	20.13	7.75	Intergraph Corp	8.00	0.00	0.0
LEAF	10.25	1.81	Interleaf Inc.	2.19	0.19	9.4
ISLI	16.38	7.50	Intersolv Inc.	9.50	-0.38	-3.8
INTU	69.50	24.88	Intuit Inc. (L)	28.38	1.25	4.6
TLC	30.31	9.25	Learning Co. (The) (L)	10.00	-0.50	-4.8
LGWX	22.25	5.25	Logic Works	7.00	-0.13	-1.8
MAPS	18.00	7.50	MapInfo Corp.	9.00	0.00	0.0
MATH	9.25	2.75	MathSoft	4.06	-0.13	-3.0
MCAF	64.38	20.38	McAfee Associates	64.38	7.13	12.4
MENT	18.50	7.38	Mentor Graphics	10.00	0.31	3.2
MIFGY	21.25	8.38	Micro Focus	16.75	0.38	2.3
MGXI	18.63	4.50	Micrografx Inc (L)	4.63	-0.13	-2.6
MSFT	103.50	47.38	Microsoft Corp.	98.63	0.00	0.0
ORCL	51.00	26.50	Oracle Corp.	41.00	1.63	4.1
PMTC	64.25	33.38	Parametric Technology	61.00	3.50	6.1
PARQ	14.63	1.63	ParcPlace Systems Inc.	1.69	-0.06	-3.6
PSFT	56.75	23.38	Peoplesoft	47.00	-0.63	-1.3
PTEC	20.38	12.50	Phoenix Technologies	17.75	1.50	9.2
PSQL	13.75	4.00	Platinum Software	10.63	-0.31	-2.9
PLAT	18.75	9.25	Platinum Technology	16.13	-0.25	-1.5
PRGS	26.75	12.13	Progress Software Corp	14.75	-2.25	-13.2
RNBO	24.25	14.63	Rainbow Technologies Inc.	17.38	-0.75	-4.1
REDB	61.00	17.13	Red Brick Systems Inc	22.75	-0.13	-0.5
SAPE	58.25	29.25	Sapient Corp	44.25	-1.75	-3.8
SCOC	9.13	5.50	SCO Inc.	7.25	0.13	1.8
SDTI	54.50	22.63	Security Dynamics Tech.	29.00	-2.25	-7.2
SQAX	39.75	17.50	SQA Inc.	22.75	-0.88	-3.7
SOTA	19.75	10.38	State of the Art	13.88	1.06	8.3
SSW	81.38	27.25	Sterling Software Inc.	28.38	0.63	2.3
SDRC	37.38	15.00	Struct. Dynamics Research	22.44	-0.56	-2.4
SYBS	35.13	13.50	Sybase Inc.	17.13	-0.63	-3.5
SYMC	18.38	8.75	Symantec Corp.	16.50	0.00	0.0
SNPS	50.50	29.00	SynOpsys	38.88	-2.00	-4.9
SSAX	26.75	8.25	System Software Assoc.	10.25	0.13	1.2
SYSF	36.50	5.38	Systemsoft Corp.	15.88	2.75	21.0
TRUV	9.63	2.44	Truevision Corp.	2.94	0.06	2.2
VIEW	17.50	8.38	ViewLogic Systems	14.56	0.75	5.4
VMRK	12.63	5.50	VMark Software Inc.	6.13	-0.75	-10.9
WALK	15.63	9.13	Walker Interactive Systems	13.25	0.50	3.9
WALL	27.50	12.25	Wall Data Inc.	16.75	-0.25	-1.5
WANG	26.13	15.38	Wang Laboratories Inc.	21.13	-1.13	-5.1
Internet					**OFF 2.51%**	
AOL	71.00	22.38	America On-Line	37.50	1.50	4.2
BBN	34.75	15.63	BBN Corp.	23.00	-0.25	-1.1
CSRV	35.50	8.63	Compuserve Corp.	10.75	0.25	2.4
EDFY	55.75	10.63	Edify Corp. (L)	11.31	-0.69	-5.7
LCOS	29.25	5.75	Lycos Inc.	19.38	0.88	4.7
NETC	44.50	11.88	Netcom On-Line (L)	12.50	-0.13	-1.0
NSCP	75.25	33.00	Netscape Comm. Corp. (L)	36.13	-0.75	-2.0
OMKT	42.25	11.50	Open Market Inc.	14.63	1.50	11.4
PSIX	19.38	6.75	PSINet	9.63	-0.38	-3.8
QDEK	19.88	3.94	Quarterdeck Corp	4.06	-0.44	-9.7
RAPT	39.25	12.75	Raptor Systems	15.25	-4.25	-21.8
SCUR	38.25	6.00	Secure Computing Corp.	6.13	-1.38	-18.3
SPYG	36.00	10.00	Spyglass Inc.	10.88	-0.88	-7.4
YHOO	43.00	15.50	Yahoo! Inc.	34.63	4.00	13.1
Semiconductors					**OFF 1.05%**	
AMD	36.13	10.25	Advanced Micro Devices	33.88	-0.38	-1.1
ADI	29.25	12.75	Analog Devices Inc.	24.75	-2.75	-10.0
CHPS	26.50	8.13	Chips and Technologies	13.25	0.00	0.0
CRUS	25.25	12.63	Cirrus Logic	14.81	-0.94	-6.0
CY	16.63	9.13	Cypress Semiconductor Corp.	12.00	-0.13	-1.0
CYRX	36.50	11.50	Cyrix	24.56	-0.44	-1.8
INTC	165.00	51.50	Intel Corp.	155.38	0.25	0.2
LSI	39.63	17.00	LSI Logic Corp.	33.38	-0.38	-1.1
LSCC	53.25	19.75	Lattice Semiconductor	51.81	1.56	3.1
MCRL	40.50	12.00	Micrel Semiconductor Inc.	33.75	-2.38	-6.6
MU	69.38	16.63	Micron Technology	34.00	0.25	0.7
MOT	69.75	44.13	Motorola Inc.	63.75	-2.00	-3.0
NSM	27.75	13.00	National Semiconductor	25.00	0.63	2.6
TXN	81.38	40.50	Texas Instruments (H)	81.38	2.38	3.0
VLSI	29.25	10.38	VLSI Technology	16.06	-0.56	-3.4
XLNX	47.75	24.50	Xilinx (H)	47.13	1.38	3.0
ZLG	40.38	14.88	Zilog Inc.	25.50	0.88	3.6
Peripherals and Subsystems					**OFF 2.14%**	
APCC	31.50	8.00	American Power Conversion	22.25	-6.13	-21.6
ADPT	46.88	17.50	Adaptec Inc.	38.38	-1.50	-3.8
CBEX	7.63	1.31	Cambex Corp. (L)	1.63	0.31	23.8
CREAF	15.13	3.50	Creative Technology Ltd.	12.13	-0.38	-3.0
RACE	24.50	3.75	Data Race Inc.	14.75	-3.63	-19.7
DTM	12.50	4.13	Dataram Corp.	10.25	0.00	0.0
EMC	39.88	16.50	EMC Corp	37.38	0.38	1.0
EMLX	21.38	9.50	Emulex Corp.	16.13	-1.50	-8.5
ESCC	29.00	19.50	Evans and Sutherland	25.13	-1.38	-5.2
EXBT	22.75	9.50	Exabyte	12.00	0.25	2.1
IISLF	4.13	1.38	Intelligent Info Systems	2.00	0.00	0.0
IOM	55.13	6.75	Iomega Corp.	16.50	-0.50	-2.9
IPLS	8.25	1.25	IPL Systems Inc.	2.25	0.25	12.5
KMAG	37.00	17.63	Komag Inc.	31.63	3.63	12.9
MTSI	29.75	12.88	MicroTouch Systems Inc.	25.88	-0.63	-2.4
PEAK	27.50	10.13	Peak Technology Group	10.25	-1.50	-12.8
PNCL	13.25	2.00	Pinnacle Micro Inc.	3.94	-0.94	-19.2
AQM	6.75	3.75	QMS Inc	5.38	-0.25	-4.4
QNTM	41.50	10.88	Quantum Corp.	39.88	-0.56	-1.4
RDUS	4.88	0.34	Radius Inc.	0.38	0.00	0.0
SEG	52.25	18.13	Seagate Technology	51.63	2.25	4.6
STK	54.38	24.00	Storage Technology	46.63	0.00	0.0
STLC	8.75	0.53	Streamlogic Corp. (L)	0.59	-0.06	-9.5
TEK	52.25	29.75	Tektronix Inc.	49.38	0.38	0.8
WDC	75.88	17.13	Western Digital Corp.	69.50	0.50	0.7
XRX	61.13	41.88	Xerox Corp.	56.63	0.25	0.4
Services					**UP 2.56%**	
AMSY	37.13	20.38	American Mgmt. Systems	22.13	0.38	1.7
ANLY	30.50	14.88	Analysts Int'l	25.63	-0.75	2.8
AUD	45.75	35.63	Auto Data Processing	43.00	1.50	3.6
BDMI	61.50	31.25	BDM International Inc.	48.00	1.75	3.8
CATP	37.25	15.00	Cambridge Tech. Partners	28.25	-1.50	-5.0
CEN	54.88	32.25	Ceridian Corp.	38.88	2.13	5.8
CDO	33.00	19.88	Comdisco Inc.	31.63	0.75	2.4
CHRZ	54.00	15.00	Computer Horizons	29.75	2.88	8.8
CSC	86.50	64.13	Computer Sciences	71.88	4.38	6.5
TSK	47.50	17.63	Computer Task Group	45.88	1.00	2.2
CPU	30.88	8.25	CompUSA Inc.	19.75	0.13	0.6
CDAT	28.63	12.75	Control Data Systems Inc.	17.00	1.13	7.1
EGGS	13.88	4.38	Egghead Discount Software (L)	5.13	0.44	9.3
EDS	63.38	40.75	Electronic Data Systems Corp	47.00	-0.50	-1.1
INAC	40.63	14.63	Inacom Corp.	31.38	0.88	2.9
INEL	11.50	3.75	Intelligent Electronics	4.13	-0.19	-4.3
KEA	35.75	11.88	Keane Inc (H)	35.75	3.75	11.7
MICA	25.00	9.00	Microage Inc	14.63	1.63	12.5
PAYX	63.63	34.38	Paychex	50.63	0.88	1.8
PMS	55.50	33.13	Policy Management Sys.	45.75	0.38	0.8
REY	29.50	18.75	Reynolds and Reynolds (H)	28.75	-0.50	1.7
SCBI	30.50	14.44	SCB Computer Tech. Inc	18.38	-0.13	-0.7
SEIC	26.38	17.75	SEI Corp.	23.13	1.75	8.2
SMED	72.13	42.25	Shared Medical Systems	53.25	6.50	13.9
SSPE	33.50	18.50	Software Spectrum Inc	22.00	-1.50	-6.4
VST	29.75	9.00	VanStar Corp.	14.75	-0.75	4.8
SNDT	47.50	31.25	Sungard Data Systems	43.25	3.88	9.8

KEY: (H) = New annual high reached in period (L) = New annual low reached in period

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Sun lets users teach older PCs new tricks

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senior systems analyst at GTE Data Services in Tampa, Fla. "It's a good idea to get some life out of boxes that have been fully depreciated already."

Karen Boucher, an analyst at The Standish Group International, Inc. in Dennis, Mass., said Project Rescue could be a good way to move companies toward network computers. "Maybe they'll see they don't need a full Microsoft Office or Windows 97, and they'll turn to [network computers]," she said. Corporate users generally use only pieces of those suites in their daily work, she noted.

COSTLY UPGRADE

Upgrading the older machines can get expensive, said William McGarry, director of information systems at Owens-Corning, Inc. in Toledo, Ohio. Owens-Corning just upgraded a large installed base of 486-based machines.

"We spent $30 million on hardware last year. That's not including labor, deployment costs and training on a new machine," McGarry said. "If you could avoid those kinds of investments, or shrink them, it would definitely be useful."

486-based PCs are hardly dinosaurs, but they can't easily run demanding software such as Windows 95 or new versions of popular office suites. They can be extremely slow for users trying to access the Internet and for applications that run on corporate intranets.

Worldwide, 91 million computers still run Windows 3.x, according to International Data Corp. in Framingham, Mass. To look at it another way, about 43% of PCs still run Windows 3.x, according to Giga Information Group in Cambridge, Mass.

To convert a PC to a network computer under Sun's Project Rescue, users will need to install the Project Rescue software on the machine's hard drive. That will not erase the Windows 3.x operating system already there. The Java operating system adds networking capabilities to the new network computer because Windows won't be in use while the network computer is operating.

PROJECT RESCUE

JavaOS
Adds networking and imaging capabilities to DOS

Java Virtual Machine
Enables the network computer to run Java programs

Hot Java Views
Adds the GUI

The Java Virtual Machine, which enables the computer to run Java programs, is included in Project Rescue. The package also includes Hot Java Views, which adds the graphical user interface, along with messaging and a browser. The browser lets users call up applications and provides access to the Internet.

To launch the Java environment, a user needs to type in only "JavaOS" at the DOS prompt. That leaves Windows dormant in the hard disk, said Curtis Sasaki, a product line manager at JavaSoft, Inc., a division of Sun. By leaving Windows resident on the hard disk, users can choose to use the machine as either a lower-end PC or a network computer.

LESS STRAIN

By taking advantage of a server-centric network computing environment, users can access applications as needed with the hybrid network computer/PC, thereby putting less strain on the 486-based machine and speeding performance. The recycled computer acts as a front-end client only; it lets the server do most of the work. With Java's platform independence, users can access multiple applications that run on a variety of operating systems.

A powerful back-end server will be needed, but users said buying one server is generally less expensive and easier to maintain than buying a slew of high-performance PentiumPCs.

McGarry said he likes the idea of Project Rescue, but he said he is concerned that 486-based machines aren't powerful enough to handle the work, because they can't handle newer versions of complex suites.

But Boucher said without the Windows operating system taking up great amounts of memory, the 486-based boxes easily could download and run most applications. "The concept isn't to keep stuff on the [client]," she explained. "You'll download it, then get rid of it."

Network computers

CONTINUED FROM PAGE 1

friendly desktops that could run a variety of applications.

For the forward-thinking Prince, chief information officer at Burlington Coat Factory Warehouse Corp., turning to network computers made perfect sense. Users of dumb terminals at the Burlington, N.J.-based retailer could gain speedy access to many applications and move up to a GUI without PC users feeling any pinch.

And the fact that Prince expects a savings of $3,000 to $4,000 per year for network computer users vs. PC users doesn't hurt, either.

Like other early adopters of network computers — including Sears, Roebuck and Co. in Hoffman Estates, Ill.; Marquette University in Milwaukee; and Uarco, Inc. in Barrington, Ill. — Burlington wants to give users uniform, PC-like systems without dipping into its profit margins.

"The truth of the matter is we've had a thin-client mentality all along, and we haven't squandered our capital on PC upgrades," Prince said. Instead, network computers have enabled Burlington to update users' desktops without having to load massive amounts of power on the desktop.

Because Burlington's network computer setup will be Java-enabled, the company plans to World Wide Web-enable its back-office applications, something it couldn't do before.

More users may soon follow Prince's lead. Several recent studies have predicted that the family of products that make up network computers can save companies money and make administration easier. An optimistic Gartner Group, Inc. study predicted savings of as much as 41% in support and capital costs over comparable networked PC environments [CW, Jan. 20].

In the study released last month called "Network Computers: Panacea and Pandora's Box," Stamford, Conn.-based Gartner attributed the savings to factors such as ease of administration, centralized management and fewer user errors.

Gartner analyst Dave Cappuccio said Burlington's use of network computers appears to be ideal because most of its users need access to a limited and well-defined set of applications.

"It's the vertical applications and limited-function uses like transaction processors and call centers where [network computers] make sense," he said, adding that access to Windows applications can still be limited.

"Right now, the jury is still out on how that type of use scales," Cappuccio said.

He said software that provides access to Windows applications, such as a product offered by Citrix Systems, Inc. in Fort Lauderdale, Fla., supports a limited number of users per server.

NCD boxes are good fit at coat factory

Burlington Coat Factory has installed nearly 100 network computers from Mountain View, Calif.-based NCD, Inc. and will steadily migrate more than 1,500 clients over the next 18 months.

NCD's box is a server-centric thin client that harnesses the processing and memory power it needs to run applications from one or several servers. Pleased with NCD, Burlington CIO Mike Prince said the company is a strong contender for the rest of Burlington's business, but he is also considering placing network computers from HDS, Inc., Sun Microsystems, Inc.'s JavaStations and Oracle Corp.'s Network Computers, for example.

Prince said each of the company's approximately 250 locations nationwide will have three to four network computers installed to handle inventory, distribution and accounting applications the company has developed using Oracle's Developer 2000 software, which will be Web-enabled later this year.

Burlington is tweaking its back-office applications using Oracle's Developer 2000 development environment. Prince said he plans to run three superservers from Beaverton, Ore.-based Sequent Computer Systems, Inc. to handle back-end applications that track the lifeblood of the business, from order control to financials. Prince says the idea that power users won't like network computers hasn't held true at Burlington. He said the company's buyers, who work out of New York and New Jersey, like their network computers and are pleased with the speed with which they can handle applications. — April Jacobs

Middleware on way for object-based apps

By Tim Ouellette

USERS TRYING TO build enterprisewide, object-based applications may soon get relief from their scalability and security woes thanks to message-oriented middleware (MOM).

They may also be able to cut back on training employees separately for object and enterprise communications technologies.

"Objects have momentum [in the market], but the fact is there have to be concerns about using them on their own, due to scalability issues," said Ed Acly, an analyst at International Data Corp. in Framingham, Mass.

The Framingham-based Object Management Group will decide by May on a standard for object-based applications to send data messages to other applications across the enterprise.

COMMON LANGUAGE

Observers expect MOM to fill the gap. MOM lets multiple applications, or application components, communicate with one another via secure data messages over heterogeneous networks and platforms.

Integration among the technologies would let objects talk directly to the messaging middleware framework.

Then the messaging middleware, which was already designed for high-end, high-volume use, would get the message to the appropriate platform.

"If this doesn't occur, we would have to train people in two different technologies," said Gerald Hinson, a technologist at Southwestern Bell Corp. in San Antonio. "Why should we buy new technology built from scratch when the middleware products already exist?"

Members of the Message Oriented Middleware Association in San Jose, Calif., have agreed to deliver complying products by next spring.

Vendors include IBM, Digital Equipment Corp. and PeerLogic, Inc.

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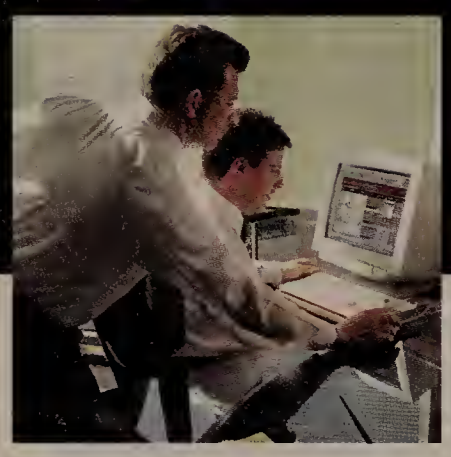

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COMMENTARY

Tax the Internet!

David Coursey

Having survived publication of last week's column about why Internet users shouldn't be anonymous and my recent missive about giving America Online the benefit of the doubt, I'm emboldened to go for the trifecta.

This week, I'm coming out strongly in support of taxing Internet use and adding a sales tax to everything that's sold electronically. Why does your friendly Internet curmudgeon support these things? Because I believe it's an enlightened approach to assuring the orderly growth and development of the 'net. Think of it like the gas tax that pays for highway construction or the airline ticket surcharge that funds airports and air traffic control.

Let me also say what I'm *not* supporting. Over the years, there have been numerous attempts by the telephone industry to surcharge for data calls on a per-minute basis. Nothing here should be construed as supporting anything but governmental taxation. Someday I'll talk about the telephone companies, but not right now.

Taxing the Internet is necessary because the Internet ought to pay for the services it requires. Regulating the 'net will prove expensive, as will policing it and developing techniques for protecting our national networks from wackos — both at home and abroad. With the Cold War over, I'm expecting a shift toward the "Tech War," a battle where your enemy is camouflaged inside the worldwide data network.

The money to fight a Tech War has to come from somewhere; it only makes sense that Internet users should help pay. As the Internet becomes more of a way of life for millions of Americans, it will begin to reduce the amount of taxes collected from other activities. It will also create a class of technology have-nots unless universal Internet availability is ensured, much as universal phone service was earlier in this century. Again, the Internet needs to pay its own way.

Closer to home, sales taxes are an important source of state and local revenue and have even been discussed as a replacement for the federal income tax. I confess that I have sometimes bought expensive items out of state. I'm not saying I did this just to *avoid* the 8% sales tax in my state, but it didn't hurt.

As online commerce grows, so does the loss of badly needed local and state tax revenue. Taxes lost when trips to the mall become trips to the PC are a fairly obvious example, but something as outwardly simple as telecommuting also has a tax impact. Not driving reduces automobile-related taxes such as those paid on gasoline, registrations and tolls. My bet is that the Internet will lower tax revenue without making much of a dent in public expenditures. So new money has to come from someplace.

Taxing the 'net will also mean going after tax cheats — businesses set up overseas to avoid U.S. taxes. Obviously, this will require the Internet equivalent of the U.S. Customs Service, standing guard at the virtual border to make sure import duties are paid. This won't be entirely successful, of course, but new laws and special "national routers" could help.

My program may sound like Big Brother. Talk of taxation always does. But revenue collection is central to a government's ability to serve its citizens. As taxation has changed to account for other technologies — railroads, trucks, the phone — so must it adapt to the rise of the Internet.

Coursey supports a flat tax, not that you asked. He is an analyst, consultant and editor and publisher of "coursey.com," an online newsletter available at www.coursey.com. You can send him an antitax screed (er, E-mail) at david@coursey.com.

Put your product where your mouth is

Charles Babcock

The Internet is a hectic, contentious environment in which to plan or make long-term IS decisions. Nevertheless, its difficulties harbor new opportunities, some of which can be turned to your advantage.

Do you want a slimmer client? Are you dismayed by the speed at which both Netscape's Navigator and Microsoft's Internet Explorer are bulking up to 7M bytes or more? Well, the Internet's history as a proving ground for simpler, low-cost technology is alive and well, and you can download smaller browsers for your own purposes. Try Opera from Norway or Ariadna from Russia, and you might be surprised at the functionality and reduction in bloat.

Granted, the thought of implementing shareware might leave you weak in the knees. You're not sure who supports it or whether the next version will be there when you need it. But a little experimentation with the alternatives could make a big impression on your vendor. Imagine a 2.5M- or 3M-byte version of your favorite commercial browser — Navigator Lite, say, or Explorer Minus. What would be wrong with that?

For that matter, your network managers have been complaining about the multiple user interfaces and constantly changing the packages they use to bring order to your sprawling network. Why not insist that your vendors get together and gear their products to work within one browser interface? Then your network could be managed from many locations, rather than just the central console, and management could be passed from location to location around the world as the day wears on. You would get 24-hour coverage without being forced to maintain 24-hour staffs at central management points.

Do you find a long line of vendors outside your office, waiting to sell you intranet products? Worse, do the internal pressures on your shop dictate that you talk to those vendors and start to make decisions on what to buy? The Internet gives them a chance to post their wares for you to download and test before committing to in-depth discussions. Vendors might be reluctant to put up a whole product suite, but you have the right to demand a sample. If a vendor declines this test, it's fair that you wonder what the company's trying to hide. And what's to prevent you from making decisions based on a competitor's greater forthrightness?

This may sound like a model for selling software that hasn't been approved by the Harvard Business School. But Netscape did it, over internal objections, with Navigator — and grabbed 75% market share. And Sun did it with Java, with thousands of programmers working with the Java virtual machine. Neither vendor is in any danger of going out of business.

As you contemplate such moves, you're witnessing a gold-rush mentality. Start-up companies are blossoming everywhere, and established vendors are all duded up as Internet entrepreneurs. In the resulting scene, it's wise to remember that opportunity sometimes arrives at your door cloaked in confusion.

Today, the debate over the network computer, the future of Java and the possible substitution of browser environments for Windows all make for enticing but hazardous decision points for IS managers. The Internet presents an opportunity to test-drive any of these technologies cheaply until you're comfortable with them.

With the Internet, after all, you're no longer a captive customer. If one supplier can't produce or doesn't wish to submit to your test, another is likely to be available on the 'net. The measure should be added value over what's already available at low cost, and IS is in a position to go for it.

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The Back Page

Dispatches & images from the fringes of the electronic frontier

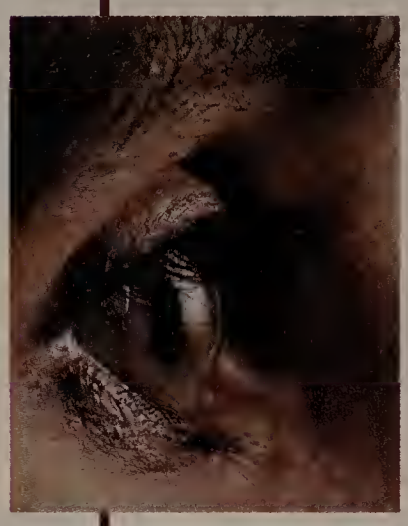
News to ponder

Moms-to-be can get a more accurate estimate of their due date with PC software developed by Robert Mittendorf, director of health studies at the University of Chicago Medical Center. According to Medical Tribune News Service, the $49.95 Windows package asks questions about a woman's age, race, previous pregnancies and other factors that influence calculation of delivery dates.

Most computers are 90% energy-efficient, but that isn't good enough for researchers Jayant Baliga and Manoj Mehrotra at North Carolina State University in Raleigh. They developed an energy-saving replacement for the "Schottky rectifier" — where most of a computer's energy loss occurs — that will be commercially available within two years.

To celebrate the 50th anniversary of the Electronic Numeric Integrator and Calculator (ENIAC) last year, professors and students at the University of Pennsylvania succeeded in replicating the original ENIAC system on one CMOS chip. The project is described on the Web at www.ee.upenn.edu/~jan/eniacproj.html.

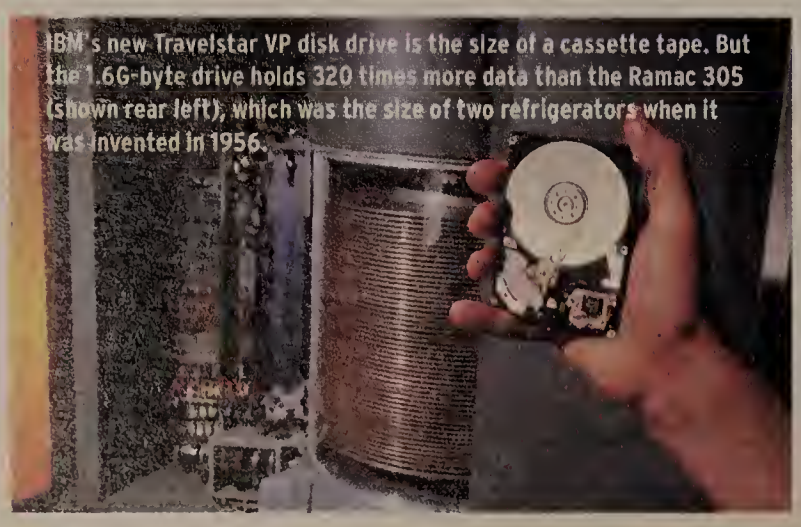
BUILDING A BIONIC EYE



Scientists at North Carolina State University, the University of North Carolina at Chapel Hill and Johns Hopkins University in Baltimore are developing a silicon microchip that acts as an artificial retina. The wafer-thin chip, just 2mm square, could be surgically implanted in the eye to restore partial sight to people who have retinal pigmentosa or other eye diseases.

New Age titles

- Director of evolution and technology at Cementos de Mexico (IS manager)
- Manager of connectedness at National Semiconductor (links Notes and intranet applications)
- Director of the enterprisewide millennium project at Clorox
- Director of plug-in evangelism at Netscape



IBM's new Travelstar VP disk drive is the size of a cassette tape. But the 1.6G-byte drive holds 320 times more data than the Ramac 305 (shown rear left), which was the size of two refrigerators when it was invented in 1956.

THE PRICE OF flat-panel monitors for desktop PCs is coming down from the lofty $5,000-plus levels. Portrait Displays in Pleasanton, Calif., recently announced that its PageMaster LCD monitor will be available later this year at a street price of about $1,500. The full-page monitor rotates for vertical or horizontal views, has zero radiation, weighs only 10 pounds and consumes less than half the power consumed by CRTs.

Send your alt.cw contributions to **mbetts@cw.com.** If your item is used, you'll receive a cool T-shirt.

Inside Lines

Cupid's arrow flies across the network

We were surprised to hear that a U.K. company set up an anonymous E-mail account on Feb. 14 so workers could secretly drop each other Valentine's Day messages. That one is sure to have sexual harassment lawyers drooling!

Grouf goofs

During a product introduction at last week's Demo97 conference in Palm Desert, Calif., Firefly Network President and CEO Nicholas Grouf let it slip that his company had acquired NetGravity. After the presentation, Grouf was visibly embarrassed about his announcement because there had been no purchase, no deal, no talks going on — nothing, nada. In fact, Grouf said he had no idea why he said it. The worst part: Grouf said, he was going to have to call NetGravity to report the huge faux pas before the press started calling.

Does Microsoft believe in General Magic?

One rumor from the West Coast says Microsoft is among the companies kicking the tires of General Magic. The company wouldn't seem to be a juicy takeover target, having never made much money licensing its Magic Cap operating system and having recently cut its staff in half. Potential buyers are perhaps more interested in a patent granted to General Magic that covers how software agents interact with one another in mobile environments. Microsoft declined comment.

Is there a BEA in Digital's bonnet?

A source close to Digital said the company will sell its ObjectBroker distributed computing integration software and DECmessageQ message queuing middleware product to BEA Systems this week. Digital declined comment, and BEA couldn't be contacted by deadline. But you can expect the announcement to be made Tuesday.

VAX users wax poetic

Maybe it's an increasing sense of frustration with Digital's sputtering comeback efforts. Or maybe it's just Digital's Open VMS strategy they don't like. But some folks in the Info-VAX newsgroup have been venting their spleen lately at Digital's marketing efforts — or lack thereof. Some wags have even been quick to offer their own tongue-in-cheek spin to the "Digital Has it Now" slogan. Among the more innovative: "Digital has had it," "Digital had it then," "Digital should have had it by now," "Digital had it but forgot to tell anyone" and "I've had it with Digital."

A reader sent us the following via E-mail this week:

"What If Dr. Seuss Wrote Technical Manuals?"

If a packet hits a pocket on a socket on a port,
And the bus is interrupted as a very last resort,
And the address of the memory makes your floppy disk abort,
Then the socket packet pocket has an error to report!
If your cursor finds a menu item followed by a dash,
And the double-clicking icons put your window in the trash,
And your data is corrupted 'cause the index doesn't hash,
Then your situation's hopeless, and your system's gonna crash!
If the label on your cable on the gable at your house,
Says the network is connected to the button on your mouse,
But your packets want to tunnel to another protocol,
That's repeatedly rejected by the printer down the hall.
And your screen is all distorted by the side effects of Gauss,
So your icons in the window are as wavy as a zouse,
Then you may as well reboot and go out with a bang,
'Cause as sure as I'm a poet, the thing is gonna hang!
When the copy of your floppy's getting sloppy on the disk,
And the microcode instructions cause unnecessary RISC,
Then you hafta flash your memory, and you'll want to RAM your ROM,
Quickly turn off your computer and be sure to tell your mom!

If you have anything newsworthy that rhymes, call news editor Patricia Keefe at (508) 820-8183 or send E-mail to patricia_keefe@cw.com.

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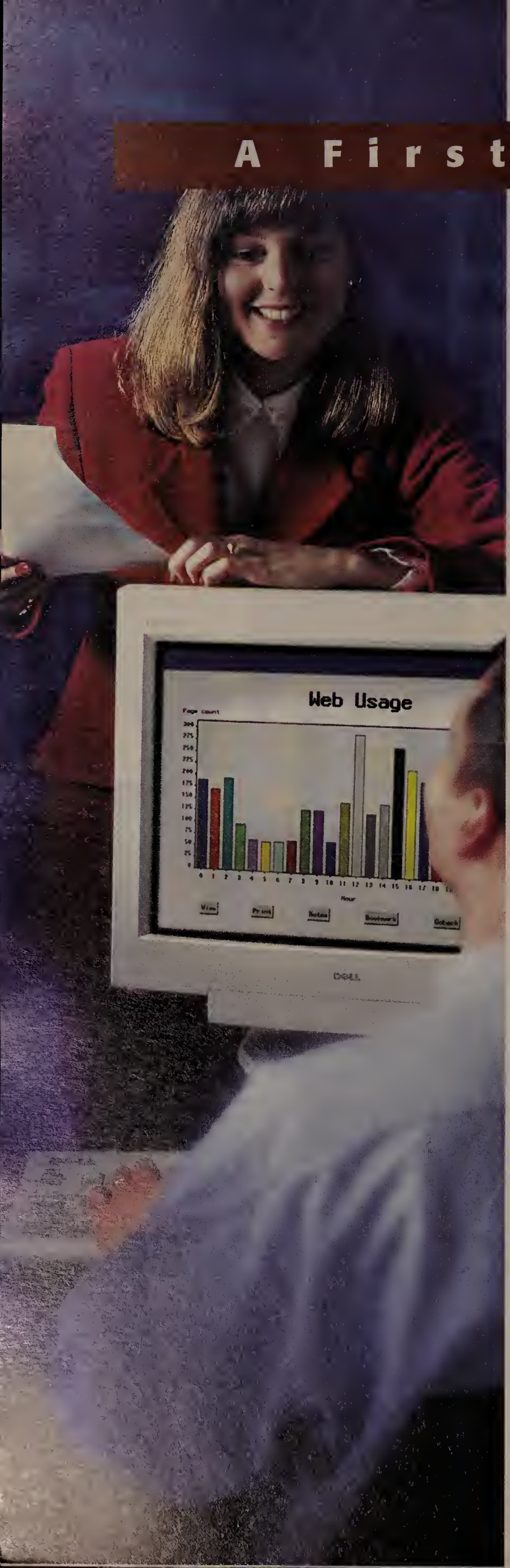

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